

Ethnic- and sex-related differences in pain characteristics, psychological distress and pain-related disability in patients attending a New Zealand teaching hospital pain service

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ABSTRACT

AIM: The aim of the present observational study was to provide a description of the demographic, psychological and pain characteristics of patients attending the Waitemata Pain Services (WPS), Auckland, New Zealand.

METHOD: Data were collected via a comprehensive paper-pencil questionnaire handed out to 798 consecutive new patients seen at the WPS over a four-year period.

RESULTS: 32.3% attending the WPS were men and 67.7% women, with a mean age of 52.1 years. 65.7% of patients were New Zealand Europeans, followed by 19.1% other Europeans, 5.7% Asians, 3.9% Māori, 2.8% Middle Eastern/Latin/Africans and 2.7% Pacific Islanders. Patients reported an average of 2.6 visits to the GP before presenting to the unit. Average pain duration was seven years and seven months. Women reported a significantly higher number of pain sites in the whole body, as well as in the left and right side of the body compared to men ($p < 0.0001$ for all). Highest interference due to pain was found for *enjoyment of life*. Men and women further differed in a range of psycho-behavioural variables, with women reporting less psychological distress and depression but more stress compared to men ($p < 0.05$ for all). Men showed higher levels of kinesiophobia ($p < 0.005$) and less pain acceptance and pain willingness ($p < 0.05$ for both). Cross-cultural comparison found Māori patients reported highest pain levels, highest number of pain sites, highest pain interference, as well as highest levels of psychological distress, depression, stress and anxiety compared to all other ethnicities. Lowest pain severity was reported for New Zealand European patients and lowest interference due to pain for Pacific Islanders. While Middle Eastern/Latin/African patients showed highest levels of kinesiophobia, Pacific Islanders had the highest tendencies to catastrophise about their pain.

CONCLUSION: There are important sex- and ethnicity-related differences in the clinical presentation of chronic pain patients attending a large, hospital-based New Zealand pain service. While service provision can be based on generalised guidelines, specific interventions should be informed by important demographic and cultural variables. Studies are needed to identify strategies to improve service delivery in subgroups of the population who may be undertreated or lack access to appropriate interventions.

Chronic pain is recognised as pain that persists past normal healing time and is usually regarded as chronic when it lasts more than three to six months.^{1,2} Worldwide prevalences are estimated at around 20%,³ with patterns of chronic pain in New Zealand being similar to those found internationally. According to data from the 2006/07 New Zealand Health Survey, one in six (16.9%) New Zealanders report chronic pain.⁴ In this particular survey, Pacific and Asian peoples had much lower odds of reporting chronic pain compared with New Zealand Europeans or ‘other’ ethnicities. This is not surprising, given that ethno-cultural variables have long been known to play a significant role not only in pain perception and expression, but also in treatment outcomes.^{5–7} Similarly, female sex has emerged as an important factor with women showing considerable differences compared to men in pain perception,⁸ as well as in reporting of pain and in the use of healthcare services.⁹ A previous New Zealand study from a large tertiary center did not identify any association between sex and ethnicity with respect to pain severity, duration, psychological factors and pain-related disability.¹⁰ However, all non-European ethnicities were collapsed into a single group, which may explain the lack of differences observed. In this regard, each ethnicity likely has its own unique beliefs and values that may lead to differences in the way individuals understand and cope with their pain. Furthermore, there are known geographical variations in ethnicity and other socio-demographic factors across New Zealand. As such, Shipton et al’s findings may not be representative of all populations in the New Zealand setting.

Overall, chronic pain accounts for a substantial proportion of physician visits as most patients are attended to in the community by their general practitioners (GP). Internationally, pain has been reported in 50% of all presentations to primary care, with 40% of these patients reporting persistent pain with important psychosocial consequences.¹¹ In many cases, primary care offers the potential to address all aspects of chronic pain, however in other cases, specialised treatment programmes are needed to restore and improve an individual’s quality of life. The Waitemata Pain Services (WPS) offer such a programme.

In a multidisciplinary setting consisting of pain physicians, a health psychologist, a clinical nurse specialist and physiotherapists, patients with chronic pain are taught how to manage their pain better by learning different ways of thinking and acting so that pain interferes less with life. The model of care is based on a self-management approach that requires an individual and their family/*whānau* to play an active role in the pain management process and that emphasises an improvement in quality of life and function, rather than an absolute cure. This may be an activity-focused intervention, mindfulness-based pain response workshop, medical review, nurse-led sleep clinic or combination of interventions. Patients seen in specialty pain clinics such as the WPS tend to have higher levels of functional impairment and psychosocial difficulties as they often present after years of suffering from chronic pain. They might therefore not be representative of other pain populations presenting to the GP or to other physicians.^{12,13}

The objective of the present study was to outline the demographic distribution and pain characteristics of patients presenting to a large public hospital-based pain clinic in Waitemata District Health Board (WDHB)—New Zealand’s largest district health board—and explore sex- and ethnicity-related differences in clinical presentation. A better understanding of the socio-demographic background of the patients utilising the service and the prevalence of pain-related problems they present with (eg, pain-related disability, depression, anxiety) might lead to improvements in resource allocation and in the design and delivery of more targeted, effective and culturally responsive interventions.

Method

Population

Data were collected from a consecutive series of baseline questionnaires completed by patients ($N=798$) referred to the WPS at WDHB, Auckland, New Zealand, over the course of four years (from 2012 to 2015). The WDHB provides hospital and community services from North Shore and Waitakere hospitals and from 30 community sites throughout the district. With more than 597,510 people, it is the largest and fastest growing New Zealand

DHB by population (60% European/New Zealand, 18% Asian, 10% Māori, 10% Pacific peoples). (<http://www.health.govt.nz/new-zealand-health-system/my-dhb/waitemata-dhb>).

Demographic information of the patients such as age, sex and ethnicity was extracted from the hospital medical records. Clinical information was provided by the patients presenting at WPS via a comprehensive paper-pencil intake questionnaire completed just prior to the time of first consultation. This questionnaire helps the clinicians in the service understand key issues affecting each patient, guide the choice of treatment pathway, and allows the evaluation of individual patient outcomes following intervention(s). The comprehensive questionnaire consists of a total of eight standardised questionnaires (for a more detailed description see the Material section) and supplementary information on demographics, employment status, health care utilisation and medication use. Additional information was obtained from a detailed neuromusculoskeletal examination and, in some cases, from clinical follow-up visits. Ethnicities were classified based on the New Zealand Ministry of Health ethnicity code table (ie, New Zealand Europeans, other European, Māori, Pacific People, Asian, Middle Eastern/ Latin/African). Data collection and analysis was approved by the Awhina Research & Knowledge Centre (RM13452).

Material

Information on pain duration and intensity was collected using self-constructed questions asking “How long have you had your pain?” (in months) and “How severe is your pain?” (responded to on a 0 *no pain* to 10 *worst pain you can imagine* scale). Number of pain sites was assessed using a mannequin composed of a 31 region coding frame on which patients were asked to “shade the areas where you experience pain”.

Information on pain catastrophising was collected using the ‘Pain Catastrophising Scale’ (PCS).^{14,15} Pain catastrophising has emerged as one of the most robust psychological predictors of adverse pain outcomes and has been repeatedly associated with increased sensitivity to pain, increased risk

of persistent pain, heightened pain intensity and severity, increased disability and higher levels of psychological distress and depressive symptoms.^{16–19} In the PCS, participants are asked to reflect on past painful experiences and to indicate the degree to which they had certain thoughts or feelings when experiencing pain. Response options for the 13 items are on a five-point Likert-type scale ranging from (0) *not at all* to (4) *all the time*. A total score, as well as three subscales scores (for rumination, magnification and helplessness) may be computed by summing the item scores. The PCS has been shown to have good psychometric properties and adequate internal consistency.^{14,15} Cronbach’s alpha in our study was 0.95 for the whole questionnaire, 0.92 for helplessness, 0.80 for magnification and 0.91 for rumination.

The 10-item Pain Self-Efficacy Questionnaire (PSEQ) was used to measure pain self-efficacy, indicating the confidence chronic pain patients have in performing activities while in pain. Low pain self-efficacy is a predictor of long-term disability and depression.²⁰ In general, higher self-efficacy appears to enhance and maintain the long-term effects of rehabilitation.¹⁸ The PSEQ covers a range of functions (eg, household chores, socialising). Participants are asked to rate how confidently they can perform the activities described, at present, despite their pain on a seven-point Likert scale (0 = *not at all confident* and 6 = *completely confident*). A total score, ranging from 0 to 60 can be calculated by adding the scores for each item. Higher scores reflect stronger self-efficacy beliefs. The measure has shown excellent psychometric properties.²¹ Cronbach’s alpha in our study was 0.95.

Depression, anxiety and stress were assessed using the short version of the Depressive, Anxiety and Stress Scale (the DASS-21).²² The 21-item self-report questionnaire measures negative affect based on the three main symptoms of depression, anxiety (eg, psychological stimulation) and stress (eg, cognitive reconstruction). Response options are on a four-point scale ranging from (0) *not valid for me* to (4) *especially valid for me*. Cronbach’s alpha in our study was 0.99 for the entire questionnaire, 0.96 for stress, 0.99 for depression and 0.99 for anxiety.

To assess the severity of pain and the impact of pain on daily functions in the past 24 hours or the past week, the Brief Pain Inventory (BPI) was used.²³ The questionnaire is composed of pain drawing diagrams, four items about pain intensity (worst pain, least pain, average pain, pain right now), two items on pain relief treatment or medication, and one item on pain interference, with seven sub-items (general activity, mood, walking ability, normal walk, relations with other people, sleep and enjoyment of life). Two main scores can be generated by adding the corresponding items: a pain severity score and a pain interference score. Each item is rated from (0) *no pain* to (10) *pain as bad as you can imagine*. The BPI has shown good psychometric properties (including internal consistency, test-retest reliability and construct validity).^{24,25} Cronbach's alpha in our study was 0.92.

The Short Form McGill Questionnaire 2 (SF-MPQ 2) provides valuable information on the sensory, affective and evaluative dimensions of the pain experience.²⁶ The 22 questionnaire items are rated on an intensity scale from (0) none to (10) worst possible. A total score can be calculated by summing all items, which can be further divided into four pain quality subscales of "continuous", "intermittent", "neuropathic" and "affective" pain. The reliability and validity of this scale has been established.²⁷ Cronbach's alpha in our study was 0.95.

The self-report Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality over a one-month time interval.²⁸ The 19 items can be summarised into seven components that produce one global score. These components include subjective sleep quality, sleep latency (ie, how long it takes to fall asleep), sleep duration, habitual sleep efficiency (ie, the percentage of time in bed that one is asleep), sleep disturbances, use of sleeping medication and daytime dysfunction. Response options for each item are on a 0–3 interval scale with higher scores indicating poorer sleep quality. The questionnaire has been used in many settings, including research and clinical activities, and has been used in the diagnosis of sleep disorders. The PSQI has shown favorable psychometric properties and has been cross-validated in numerous populations.²⁹

The Tampa Scale for Kinesiophobia (TSK) is one of the most frequently employed

measures to assess fear of movement/(re) injury and has been applied to various pain conditions such as chronic low back pain³⁰ or fibromyalgia.³¹ In the present study, the shorter version consisting of 11 items was used (TSK-11).³² Each item is scored on a four-point Likert-type scale. Scoring possibilities range from (1) *strongly disagree* to (4) *strongly agree*. Sample items are, for example: "I'm afraid that I might injure myself if I exercise" or "My body is telling me I have something dangerously wrong". The psychometric properties of the scale are comparable to those of the original TSK with good internal consistencies, test-retest reliability, responsiveness and concurrent validity and predictive validity.³² Cronbach's alpha in our study was 0.96.

The 20-item self-report Chronic Pain Acceptance Questionnaire (CPAQ) was applied for the measurement of acceptance of pain.³³ Acceptance of pain is thought to reduce unsuccessful attempts to avoid or control pain and thus focus on engaging in valued activities and pursuing meaningful goals. Factor analyses of the original measure identified two subscales: Activity engagement (sample item: "I am getting on with the business of living no matter what my level of pain is") and pain willingness (sample item: I would gladly sacrifice important things in my life to control this pain better). All items are scored on a seven-point scale ranging from (0) *never true* to (6) *always true*. Subscale scores, as well as a total score can be computed by adding the respective items together. Higher scores indicate higher levels of acceptance. The CPAQ has shown excellent psychometric properties.³⁴ Cronbach's alpha in our study was 0.99 for the entire questionnaire and 0.99 for both subscales.

Pain Disability Index (PDI)

The Pain Disability Index (PDI) is a brief instrument developed to assess self-reported, pain-related disability across seven areas of life activity: family/home, recreation, social, occupation, sexual, self-care, life-support and average.³⁵ Participants use a 0 (no disability) to 10 (total disability) numeric rating scale to rate the degree of impairment. A German version of the PDI has been developed by Dillman and colleagues (1994), which showed good internal consistency of the overall score ($\alpha=.86$) and sufficient validity.

Statistical analyses

Data handling and all statistical analyses were undertaken using SPSS 24.0 (IBM Corp, Armonk, NY, USA) and STATA 14 (StataCorp LP, College Station, TX, USA). Owing to deviation from the normal distribution of most variables, non-parametric statistical methods were chosen for all analyses. Ordinal scaled variables were treated in a continuous manner. For all analyses, a P value less than 0.05 was considered statistically significant, unless stated otherwise. For descriptive statistics, chi-square tests were used to assess differences between sex and across ethnicities on categorical and binary data. Mann–Whitney tests were conducted to assess differences between

men and women on the continuous variables. Univariate Kruskal–Wallis analyses (nonparametric test, equivalent to ANOVA) were calculated to compare differences between ethnic groups.

Results

Socio-demographic characteristics

Over the four-year period, data from a total of 798 new patients were collected, consisting of 258 (32.3%) men and 540 (67.7%) women. Socio-demographic and pain characteristics of the overall sample and by sex are summarised in Tables 1 and 2. The mean age of patients attending the WPS was 52.1 years. The majority of men (39.1%) and women (41.8%) were currently

Table 1: Descriptive statistics for categorical variables between men and women in the total sample of new patients presenting to the WDHB Pain Management Unit (N=798).

	Overall sample (n=798)		Males (n=258)		Females (n=540)		Chi-square ^a	p value
	N	%	N	%	N	%		
Ethnicity							3.52	.741
<i>NZ European/Pakeha</i>	510	65.72	158	64.97	352	66.54		
<i>Other European</i>	148	19.07	49	19.84	99	18.71		
<i>Māori</i>	30	3.87	9	3.64	21	3.97		
<i>All Pacific</i>	21	2.71	10	4.05	11	2.08		
<i>Asian</i>	44	5.67	15	6.07	29	5.48		
<i>Middle Eastern/Latin/African</i>	22	2.84	6	2.43	16	3.02		
<i>Other</i>	1	.129	0	0	1	.19		
Work status							2.89	.576
<i>Retired</i>	88	13.17	33	14.67	54	12.27		
<i>Currently working/studying</i>	274	41.02	88	39.11	184	41.81		
<i>Returning to work</i>	38	5.69	15	6.67	23	5.22		
<i>Intending to return</i>	152	22.75	55	24.44	97	22.05		
<i>Not intending to return</i>	116	17.37	34	15.11	82	18.64		
Financial assistance							5.89	.207
<i>WINZ benefit</i>	227	34.76	81	37.85	146	33.49		
<i>ACC weekly compensation</i>	14	2.14	7	3.27	7	1.60		
<i>Superannuation</i>	163	24.96	52	24.30	110	25.23		
<i>Private insurance payments</i>	1	.15	1	.47	0	0		
<i>No financial assistance</i>	248	37.98	73	34.1	173	39.68		

*p<.05, **p<.001.

^aPearson Chi-square test for mean differences.

working/studying or returning/intending to return to work (28.4%), whereas the minority 17.4% of the overall sample had no intentions to return to work (Table 1). Patients reported on average 2.6 visits to the GP and/or two visits to a health professional, but only one visit to a medical specialist or an alternative health practitioner in the six months prior to attending the Pain Services. In terms of financial assistance, around a third reported WINZ (Work and Income New Zealand) benefits (34.8%) followed by superannuation (24.9%). 37.9% reported no financial assistance. Overall, men and women did not differ in terms of any of the assessed socio-demographic variables.

Pain characteristics and pain-related disability

Patients reported an average pain duration of seven years and seven months (Table 2), ranging from two months to 65

years (SD 104.9). Based on a 10-point scale, average lowest pain was 3.9 and highest pain 8.1. Usual and current pain was 5.8 and 5.9, respectively. While not different in terms of pain duration and intensity, men and women differed significantly in the number of pain sites, with women reporting a higher number of pain sites in the whole body ($p < 0.0001$), as well as in the left ($p < 0.001$) and right ($p < 0.0001$) side of the body (Table 2). In terms of interference due to pain as assessed by the BPI, the highest interference was reported for *enjoyment of life* (6.8), closely followed by *normal work* (6.8) and the lowest for *walking ability* (5.6). For the PDI, interference was highest in the domain of *recreation* (7.0) and *occupation* (6.7), and lowest for *self-care* (4.2). No sex differences could be detected for any of the assessed domains apart from *enjoyment of life*, with men reporting a greater restriction compared to women (7.2 vs 6.6.; $p = 0.05$).

Table 2: Descriptive statistics for continuous variables between men and women in the total sample of new patients presenting to the Waitemata Pain Services ($n = 798$).

	Overall ($n = 798$)			Males ($n = 258$)			Females ($n = 540$)			p value ^a
	N	Mean	SD	N	Mean	SD	N	Mean	SD	
Age	783	52.11	17.41	255	52.38	16.48	527	52.01	17.86	.824
Frequency of visits to										
GP/Family doctor(s)	666	2.63	2.59	224	2.54	2.44	441	2.68	2.67	.544
Medical specialist(s)	619	.93	1.71	201	.85	1.15	415	.95	1.93	.888
Health professionals	588	2.00	4.45	198	1.43	2.84	387	2.30	5.07	.799
Alternative professionals	588	.96	2.47	191	1.04	2.96	394	.92	2.21	.192
Hospital ED	609	.49	1.34	199	.59	1.57	407	.44	1.21	.748
Hospital admission overnight	597	.24	.72	196	.35	.93	398	.19	.58	.097
Pain duration (months)	672	91.42	104.91	218	89.23	110.22	451	92.47	102.35	.530
Lowest pain	748	3.88	2.39	244	3.85	2.42	501	3.88	2.37	.885
Highest pain	763	8.10	1.66	247	8.01	1.70	513	8.14	1.65	.400
Usual pain	749	5.82	1.95	238	5.71	1.98	508	5.86	1.93	.338
Current pain	264	5.92	2.18	90	5.81	2.23	171	5.94	2.16	.517
Number of pain locations										
Left side of body	790	4.47	3.24	255	3.89	2.92	532	4.76	3.35	.001*
Right side of body	790	4.52	3.28	255	3.83	2.89	532	4.86	3.41	.000**
Over whole body	790	6.90	4.95	255	5.84	4.37	532	7.43	5.14	.000**
Psychological distress	761	23.20	15.45	250	24.64	14.96	508	22.46	15.66	.030*
Depression	772	8.12	6.19	253	8.95	6.31	516	7.70	6.09	.009*

Table 2: Descriptive statistics for continuous variables between men and women in the total sample of new patients presenting to the Waitemata Pain Services (n=798) (continued).

<i>Anxiety</i>	768	6.00	5.14	252	6.06	5.04	513	5.96	5.20	.530
<i>Stress</i>	764	9.12	5.81	251	9.76	5.45	510	8.81	5.96	.019*
<i>Pain self-efficacy</i>	784	25.25	13.60	252	24.55	13.15	529	25.60	13.85	.402
<i>Kinesiophobia</i>	765	27.24	7.98	252	28.56	7.92	510	26.56	7.93	.001**
<i>Pain catastrophising</i>	758	26.15	14.03	248	27.22	14.00	507	25.59	14.04	.119
<i>Magnification</i>	770	4.87	3.50	249	5.13	3.55	518	4.74	3.46	.150
<i>Rumination</i>	767	8.75	4.99	250	9.21	4.93	514	8.50	5.00	.070
<i>Helplessness</i>	770	12.61	6.63	251	12.92	6.69	516	12.47	6.62	.376
<i>Chronic pain acceptance</i>	334	52.75	18.80	117	49.51	18.14	214	54.72	18.86	.019*
<i>Activity engagement</i>	338	32.46	12.36	118	31.30	12.30	217	33.21	12.34	.193
<i>Pain willingness</i>	337	20.25	9.92	117	18.37	8.87	217	21.33	10.31	.010*
BPI-interference										
<i>General activity</i>	364	6.66	2.54	119	6.68	2.50	242	6.62	2.56	.901
<i>Mood</i>	364	6.38	2.73	120	6.38	2.70	241	6.36	2.77	.984
<i>Walking ability</i>	357	5.56	3.24	118	5.49	3.15	236	5.61	3.28	.674
<i>Normal work</i>	357	6.79	2.53	117	6.78	2.49	237	6.77	2.56	.877
<i>Relations with other people</i>	359	5.59	3.03	119	5.68	2.92	237	5.54	3.11	.835
<i>Sleep</i>	361	6.20	3.09	119	6.32	3.12	239	6.09	3.07	.442
<i>Enjoyment of life</i>	366	6.84	2.66	121	7.24	2.45	242	6.61	2.74	.050*
<i>Average interference</i>	348	6.30	2.19	115	6.42	2.14	230	6.22	2.22	.469
PDI interference										
<i>Family/home responsibilities</i>	425	6.11	2.24	134	5.88	2.21	291	6.21	2.24	.087
<i>Recreation</i>	419	7.00	2.23	132	7.08	2.28	287	6.97	2.22	.552
<i>Social activity</i>	417	6.33	2.47	130	6.42	2.38	287	6.29	2.51	.653
<i>Occupation</i>	406	6.72	2.37	129	6.84	2.30	277	6.67	2.40	.433
<i>Sexual behaviour</i>	306	6.26	3.27	115	6.45	3.23	191	6.14	3.30	.424
<i>Self-care</i>	424	4.42	2.70	135	4.35	2.75	289	4.46	2.67	.711
<i>Life-support activity</i>	415	4.82	2.73	131	4.94	2.74	284	4.76	2.73	.535
<i>Average interference</i>	285	5.86	2.11	107	5.99	2.07	178	5.77	2.14	.271
<i>Average pain interference (incl. BPI-I and PDI)</i>	792	6.12	2.11	254	6.14	2.06	535	6.08	2.14	.693
<i>Trouble sleeping due to pain</i>	356	2.60	.78	119	2.65	.74	234	2.57	.80	.393
<i>Subjective sleep quality</i>	356	1.73	.87	117	1.75	.92	236	1.71	.85	.623

* $p < .05$, ** $p < .001$.

^aMann-Whitney U test comparing men and women.

Psychological factors and comorbidities

While not significantly different for pain self-efficacy and pain catastrophising, men and women differed in terms of chronic pain acceptance, kinesophobia, psychological distress, stress and levels of depression (Table 2). Interestingly, women reported less psychological distress ($p < 0.05$) and depression ($p < 0.01$), but more stress

compared to men ($p < 0.05$). Men further reported higher levels of kinesophobia ($p < 0.005$), and less pain acceptance and pain willingness ($p < 0.05$ for both).

Ethnic distribution and differences

With 65.7%, the vast majority of patients attending WPS were New Zealand Europeans, followed by other Europeans (19.1%). Only 5.7% were Asians, 3.9% Māori, 2.7% Pacific Islanders and 2.8% Middle Eastern/

Table 3: Demographic and pain characteristics by ethnicity—summary of the main findings.

	NZ/European (n=510)	Other European (n=148)	Māori (n=30)	All Pacific (n=21)	Asian (n=44)	Middle Eastern/ Latin/African (n=22)	
	Mean	Mean	Mean	Mean	Mean	Mean	p value
Lowest pain	3.57	4.05	5.48	5.60	4.55	5.05	.000**
Highest pain	8.02	8.09	9.17	8.35	8.17	8.31	.000**
Usual pain	5.66	5.88	7.09	6.70	6.06	6.00	.002*
Number of pain locations							
Left side of body	4.38	4.35	6.57	5.32	4.19	3.91	.046*
Right side of body	4.38	4.45	6.82	4.95	4.55	4.32	.023*
Over whole body	6.70	6.87	10.29	7.79	6.74	6.41	.032*
Psychological distress	21.91	23.98	36.13	31.25	25.42	24.98	.000**
Depression	7.65	8.38	12.27	10.78	9.01	9.11	.003*
Anxiety	5.55	6.13	11.01	8.89	7.27	7.07	.000**
Stress	8.74	9.43	12.72	11.24	9.56	9.39	.015*
Kinesophobia	26.48	26.93	31.30	31.55	30.33	32.50	.000**
Pain catastrophising	24.43	25.53	34.75	37.92	34.62	31.30	.000**
Magnification	4.41	4.82	6.71	7.81	7.38	6.19	.000**
Rumination	8.16	8.52	11.75	12.75	11.68	10.62	.000**
Helplessness	12.01	12.23	16.29	17.37	15.49	14.49	.000**
PDI interference							
Family/home responsibilities	6.00	6.16	7.58	5.37	6.50	6.23	.033*
Social activity	6.17	6.42	7.97	5.89	6.66	6.92	.042*
Occupation	6.59	6.70	8.22	5.97	7.33	7.25	.029*
Self-care	4.14	4.63	6.66	4.47	5.54	4.38	.001**
Life-support activity	4.67	4.49	7.21	5.00	5.67	5.08	.002*
Average interference (7 items)	5.70	5.83	7.87	5.29	6.47	6.17	.008*

* $p < .05$, ** $p < .001$.

Highest variable expressions are highlighted in bold.

Latin/Africans (Table 1). Cross-cultural comparison of the main study variables showed significant differences for pain characteristics, pain disability, psychological and psycho-behavioral factors (for full information see supplementary Table 1, for a summary of the main findings Table 3). In terms of pain severity, Māori patients reported the highest pain levels across the categories of highest ($p < .0001$) and current pain ($p < .005$) compared to the other ethnicities. Lowest pain severity could be observed for New Zealand Europeans and other European patients. Māori patients also reported the highest number of pain sites across the whole body (10.3), as well as on the left (6.6) and right (6.8) side of the body ($p < .05$ for all), followed by Pacific Islanders. Pain interference according to the BPI was not significantly different across the various ethnic groups but significant disparities could be detected for the PDI domains of *family/home, social activity, occupation, self-care, life-support activity* and for *average interference*. Again, Māori patients reported the highest levels of interference across all PDI domains, whereas Pacific Islanders reported the lowest levels, closely followed by New Zealand Europeans (Table 3). A similar picture emerged for psychological distress, depression, stress and anxiety, where Māori patients scored highest on all variables compared to the other ethnic groups, whereas again New Zealand Europeans scored lowest ($p < 0.05$ for all). Highest levels of kinesiophobia were reported by Middle Eastern/Latin/Africans (32.5), closely followed by Pacific Islanders (31.55). Pacific Island patients had the highest tendencies to catastrophise about their pain (37.9), followed by Māori (34.8) and Asians (34.6).

Discussion

Chronic pain is a major public health issue in New Zealand and its management relevant to all healthcare practitioners. In this observational study we provide a description of the demographic, psychological and pain characteristics of chronic pain patients attending a hospital-based multidisciplinary chronic pain service in Auckland, New Zealand. Differences in pain presentation, pain-related disability and pain-relevant psychological factors were noted across sex and ethnicity.

Sex differences

While female patients significantly outnumbered male patients (68% vs 32%), they did not differ in terms of pain duration and pain intensity, but presented with a significantly higher number of pain sites in the whole, as well as in the right and left side of the body. The predominance of women in our patient population is in accordance with demographic data from other, international pain services³⁶ and with information from epidemiologic studies suggesting chronic pain is more prevalent in women compared to men.³⁷ There are well-established sex differences in pain sensitivity and pain processing that may at least partially account for these observations.³⁸ Furthermore, the prevalence of chronic widespread pain is known to be much higher in females than in males,³⁹ in agreement with our findings. Interestingly, we observed several sex-related differences in pain-related psychological factors. It is possible that sex-related differences in pain coping strategies at least partly explain the differences observed in psychological factors such as depression and emotional distress, despite men and women reporting a similar pain intensity and duration. Clinical studies suggest that men and women often cope with pain differently.⁴⁰ Women are more likely to use coping strategies involving social support and active self-management. In contrast, social norms often emphasise reduced pain expression in men and a focus on enduring pain.⁴¹ This may lead to men feeling more isolated and distressed by their pain. Alternatively, our findings may reflect sex-related differences in care-seeking behavior⁴² with men experiencing higher levels of emotional distress before seeking tertiary level care.

In agreement with our findings, recent studies in patients with chronic pain have shown that men are less accepting of their pain,⁴³ more likely to perceive their pain as reflecting harm and adopt avoidance coping strategies.^{43,44} These findings suggest men may benefit more from acceptance-based treatment approaches and require more educational input regarding the pathophysiology of chronic pain, particularly if they are going to engage in activity or exercise-based interventions.

Attendance by ethnicity and ethnic pain-related differences

Attendance and engagement with a self management approach to pain management does require individuals to have the ability to travel to the various pain centres at hospitals. Many of the patients in this study were unemployed or had very limited personal finances, making simple logistical issues such as attending clinic appointments challenging. This is magnified by being in a DHB with a large geographical area. Devolvement of services to primary care and the use of remote medicine are obvious alternatives but are yet to be established. This may also be reflected by the number of health professionals involved in patient care over the prior six months. The New Zealand health system has a 'user pays' system for primary care and as such any initiative based in this area would disadvantage low wage earners and unemployed people. While patients may have had their pain for several years, presentation to a tertiary service took over seven years to occur. It is unclear from this survey the reasons for this. It may in part be due to unwillingness by GPs to refer, or reluctance of the patient to attend. The WPS model allows for triage and engagement within 16 weeks of referral, so delay from initial referral should no longer be a major barrier to service access.

The present study found that New Zealand Europeans constituted the vast majority of patients (65.7%) attending our service. According to 2015 data, the population served by WPS comprises 9.7% Māori, 7.3% Pacific Islander and 20% Asians. However, with only 3.9% Māori, 5.7% Asians and 2.7% Pacific Islanders attending the Pain Services, these ethnic groups were significantly under-represented. This may be of particular interest for Māori when it is considered that recent data from the New Zealand Health Survey suggests that Māori are 1.2 times more likely to experience any chronic pain condition compared to non-Māori.⁴⁵ The under-representation of ethnic minorities in our service may be due to a number of factors such as access to primary and secondary care services, communication issues, financial barriers, geographical location, use of traditional medicine/healing interventions, lack of belief in western medical systems or genetic/epigenetic differences in pain perception and modulation. Importantly, individuals of certain ethnic groups (eg, Asians, Māori) have been shown to be more reluctant

to report chronic pain relative to other groups.⁴⁶ This non-disclosure of pain and associated symptoms may explain the lower proportion of individuals in certain ethnic groups, as it may be that they have gone unnoticed in the healthcare system. According to our findings, these individuals (eg, Māori) tend to present later to our service and with increased scores on adverse pain-related measures (eg, higher pain severity and disability, more pain sites and increased negative affect). Their delayed health-seeking behaviours may reflect a number of factors, including but not limited to: lack of culturally meaningful services, negative past experiences in healthcare settings, fear of being a burden and desire for privacy.⁴⁶ It is also possible that ethnic differences in other factors such as occupation (eg, manual work vs office work) could partly explain the increase in pain intensity and subsequently, psychological distress. An important consideration lies in the lack of knowledge about the most appropriate paradigms of pain management across different cultural backgrounds. The catchment area for WPS has a large Asian population, many of whom cannot speak fluent English. Yet, 'Asian' covers a wide spectrum of nationalities and may be too simplistic to be useful in identifying specific targeted treatment plans.

Study limitations

It is important to acknowledge that there are some limitations to our study. First, the present study results cannot be generalised to other pain clinic populations, as the data was only assessed in one pain service. Similarly, the sample sizes of Māori and other ethnic minorities were relatively small and follow-up data unavailable, therefore the presented results need to be interpreted with caution and more large-scale studies are needed to get a more in-depth understanding of possible differences. Furthermore, the catchment area is restricted to a specific region in Auckland, therefore ethnic distributions might not necessarily be representative for the whole of New Zealand (eg, more rural areas). Finally, several sources of referral biases might have been present such as location, availability, waiting list, referring physicians' and patients' preferences, specialisation, treatment approach, etc.) and could have influenced the types and numbers of patients attending this specific Pain Service. As far as the screening documents are concerned most have not

been validated in ethnic populations such as Samoan, Tongan, Korean or Māori. In addition, the proportion of non-English questionnaires and difficulty with any non-pharmacological interventions (eg, physiotherapy, group mindfulness-based pain response workshops) limits potential access and engagement.

Conclusion

Our study constitutes the first detailed report on the demographic and pain characteristics of patients attending a multidisciplinary hospital-based pain service in Auckland, New Zealand. Many patients present with psychological sequelae of chronic pain, yet resources may not match requirements and may be too biomedically focused. Though not necessarily representative of other pain clinics, a better knowledge of patient characteristics, especially in terms of sex and ethnic differences in pain presentation is important for the development of more effective treatment models. While service provision

can be based on generalised guidelines, specific interventions may need to be tailored to reflect important differences in pain presentation, illness beliefs and pain coping strategies across gender and ethnicity. While biomedical treatments are attractive for chronic pain management, the evidence clearly demonstrates that the majority of meaningful improvements arise from activity and cognitive interventions in a multidisciplinary setting. This is challenging for English speaking and European-based groups of patients—and almost impossible for significant proportions of our population. Raising awareness of the issue is useful, but future strategies include education at under and postgraduate level, language and cultural resources and the integration of healthcare professionals from a variety of cultural and ethnic backgrounds. Further studies are needed to identify specific strategies to improve service delivery and outcomes in ethnic minorities who may be undertreated or lack access to appropriate interventions.

Supplementary Table 1: Demographic and pain characteristics by ethnicity.

	NZ/European (n=510)		Other European (n=148)		Māori (n=30)		All Pacific (n=21)		Asian (n=44)		Middle Eastern/Latin/African (n=22)		p value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Age	51.22	18.05	56.29	17.47	52.67	13.43	52.00	14.13	50.91	13.85	50.67	16.37	.081
Frequency of visits to													
GP/family doctor(s)	2.58	2.48	2.39	2.13	3.63	2.96	2.60	1.63	3.54	5.02	2.78	2.32	.184
Medical specialist(s)	.99	1.97	.79	1.10	1.11	1.10	.79	.97	.69	.76	1.00	1.13	.737
Health professionals	2.05	4.40	1.81	4.22	2.45	7.12	1.77	4.48	2.00	3.89	2.24	5.71	.932
Alternative health professionals	.94	2.62	.80	2.02	.69	1.66	.47	1.06	1.30	2.01	1.67	3.39	.204
Hospital ED	.55	1.48	.36	.83	.64	1.45	.46	1.13	.54	1.62	.50	.94	.983
Hospital admission overnight	.26	.72	.16	.47	.31	.87	.58	1.73	.15	.60	.46	1.22	.800
Pain duration	98.29	110.0	86.36	114.79	101.0	98.46	70.06	44.75	50.02	39.30	70.72	44.43	.156
Lowest pain	3.57	2.28	4.05	2.39	5.48	2.66	5.60	2.64	4.55	2.23	5.05	2.57	.000**
Highest pain	8.02	1.60	8.09	1.65	9.17	.92	8.35	1.28	8.17	2.41	8.31	2.18	.000**
Usual pain	5.66	1.87	5.88	2.03	7.09	1.91	6.70	2.01	6.06	1.88	6.00	2.62	.002*
Current pain	5.84	2.23	5.79	1.99	7.70	1.30	6.80	2.39	6.40	1.79	6.14	3.24	.298
Number of pain locations													
Left side of body	4.38	3.21	4.35	3.15	6.57	3.74	5.32	3.89	4.19	3.16	3.91	3.05	.046*
Right side of body	4.38	3.22	4.45	3.35	6.82	3.45	4.95	4.22	4.55	3.05	4.32	3.26	.023*
Over whole body	6.70	4.90	6.87	4.97	10.29	5.44	7.79	6.11	6.74	4.53	6.41	4.54	.032*

Supplementary Table 1: Demographic and pain characteristics by ethnicity (continued).

Psychological distress	21.91	15.13	23.98	15.18	36.13	16.64	31.25	21.12	25.42	15.45	24.98	13.13	.000**
Depression	7.65	6.09	8.38	6.32	12.27	6.28	10.78	7.50	9.01	5.99	9.11	5.52	.003*
Anxiety	5.55	4.94	6.13	4.96	11.01	5.34	8.89	6.86	7.27	5.67	7.07	4.71	.000**
Stress	8.74	5.77	9.43	5.85	12.72	6.00	11.24	7.41	9.56	5.50	9.39	4.86	.015*
Pain self-efficacy	25.92	13.35	25.84	13.87	21.21	16.72	21.96	14.45	21.62	14.54	21.00	11.28	.054
Kinesiophobia	26.48	8.02	26.93	7.84	31.30	6.67	31.55	6.98	30.33	7.28	32.50	5.90	.000**
Pain catastrophising	24.43	13.63	25.53	14.76	34.75	12.33	37.92	11.25	34.62	13.79	31.30	9.30	.000**
Magnification	4.41	3.34	4.82	3.60	6.71	2.87	7.81	3.37	7.38	3.62	6.19	3.27	.000**
Rumination	8.16	4.90	8.52	5.11	11.75	4.64	12.75	3.32	11.68	4.66	10.62	3.37	.000**
Helplessness	12.01	6.49	12.23	7.14	16.29	6.03	17.37	5.84	15.49	6.56	14.49	4.25	.000**
Chronic pain acceptance	53.95	18.38	52.76	18.97	55.10	23.27	33.27	15.23	53.10	19.08	42.89	15.57	.082
Activity engagement	32.92	11.70	32.27	13.04	38.78	14.88	20.52	14.53	34.88	13.66	26.67	11.72	.130
Pain willingness	21.12	9.81	19.97	10.16	16.32	13.12	12.75	10.77	18.21	8.41	16.22	6.55	.055
BPI-interference													
General activity	6.53	2.54	6.74	2.59	7.65	2.94	8.67	1.21	6.70	2.23	6.22	2.73	.143
Mood	6.32	2.81	6.50	2.67	6.50	2.85	7.33	1.21	6.80	2.35	5.44	2.40	.756
Walking ability	5.39	3.29	6.08	3.22	5.85	3.43	8.50	1.52	5.45	2.76	4.44	2.55	.090
Normal work	6.66	2.58	6.87	2.56	7.05	2.87	8.60	1.67	7.10	2.17	5.89	2.32	.353
Relations with other People	5.57	3.08	5.58	3.19	5.15	3.32	7.17	1.33	5.75	2.83	5.00	2.29	.824
Sleep	6.08	3.20	5.94	3.01	7.40	2.76	8.17	1.47	7.15	2.52	5.78	1.92	.221
Enjoyment of life	6.85	2.67	6.81	2.79	7.10	3.41	8.00	1.90	6.95	2.06	5.78	2.39	.640
Average interference (7 items completed)	6.19	2.18	6.42	2.23	6.67	2.69	8.20	1.42	6.56	2.12	5.51	1.74	.188
PDI interference													
Family/home responsibilities	6.00	2.18	6.16	2.44	7.58	1.70	5.37	2.18	6.50	2.43	6.23	2.49	.033*
Recreation	6.90	2.09	7.20	2.56	8.05	1.71	6.39	3.05	7.34	2.41	7.42	2.07	.081
Social activity	6.17	2.45	6.42	2.58	7.97	1.80	5.89	2.87	6.66	2.75	6.92	2.06	.042*
Occupation	6.59	2.32	6.70	2.60	8.22	1.81	5.97	2.58	7.33	2.33	7.25	2.14	.029*
Sexual behaviour	5.99	3.33	6.70	3.28	7.77	2.64	4.69	3.57	7.11	2.37	7.22	3.15	.061
Self-care	4.14	2.64	4.63	2.76	6.66	2.33	4.47	2.59	5.54	2.44	4.38	2.79	.001**
Life-support activity	4.67	2.66	4.49	2.82	7.21	2.34	5.00	3.07	5.67	2.52	5.08	2.75	.002*
Average interference (7 items)	5.70	2.01	5.83	2.44	7.87	1.71	5.29	2.12	6.47	2.11	6.17	1.66	.008*
Trouble sleeping due to pain	2.55	.84	2.73	.58	3.00	.00	3.00	.00	2.79	.54	2.33	.71	.052
Subjective sleep quality	1.67	.90	1.77	.85	2.20	.75	1.50	.84	1.80	.77	1.89	.93	.413

* $p < .05$, ** $p < .001$.

Competing interests:

Nil.

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