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Cross-sectional study examining the epidemiology of chronic pain in Nepal

Cassie Higgins[a,*], Saurab Sharma[b,c], Inosha Bimali[d], Tim G. Hales[e], Paul A. Cameron[a], Blair H. Smith[a], Lesley A. Colvin[a]

Abstract

Introduction: The World Health Organization recognizes chronic pain as a global public health concern; however, there is a bias towards research conducted in relatively affluent nations. There is a dearth of large-scale epidemiological studies in Nepal using rigorously validated, cross-culturally adapted instruments.

Objectives: The aim of this study was to examine the prevalence of both chronic pain and chronic pain of predominantly neuropathic origin and their associations with a range of sociodemographic and psychosocial characteristics.

Methods: We conducted a cross-sectional study of adults (≥18 years) in all households in Ranipani, Baluwa Village Development Committee, Nepal. All adults (n = 887) were approached, and those consenting, who met the inclusion criteria (n = 520, 58.6%), participated. Questionnaires validated in Nepali were used to examine several constructs: demographics; chronic pain; neuropathic pain; pain catastrophizing; resilience, pain intensity; pain interference; sleep disturbance; and depression.

Results: The point prevalence of chronic pain was 53.3% (n = 277). The point prevalence of chronic pain of predominantly neuropathic origin was 12.7% (n = 66). Chronic pain was associated with female gender, older age, and manual labour occupations. Using standardized scoring techniques, compared with available population estimates from other countries, those with chronic pain were associated with lower pain intensity and resilience scores and higher pain catastrophizing, pain interference, and depression scores.

Conclusion: These findings are broadly comparable to epidemiological studies from other countries, and these indicate areas for targeting interventions (eg, occupational and mental health). For comparison, more data are needed, from larger population samples in this region.

Keywords: Chronic pain, Neuropathic pain, Epidemiology, Nepal, Health measures

1. Introduction

The World Health Organization recognizes chronic pain (CP) as a global public health concern[48] because it has a profound effect on individuals and society.[11,19,32,43] The predominance of research funded by high-income countries (HICs) has resulted in a research bias towards affluent nations.[18] Conversely, researchers in low-income and middle-income countries (LMICs) face numerous challenges due to a lack of infrastructure and funding.[22] A number of systematic reviews identified considerable variability both between and within countries concerning CP prevalence.[21,25,42,53] Elzahaf et al.[13] compared the prevalence of CP in HICs with that in LMICs (identified by a Human Development Index [HDI] of <0.9, as recommended by the United Nations[49]). They found a significantly higher prevalence of CP in LMICs (33.9%) compared with HICs (29.9%) and found that studies conducted in LMICs were associated with relatively weaker methods and smaller sample sizes. There is a need to quantify and characterize the burden of CP in LMICs to facilitate a more

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accurate global understanding of CP and appropriate targeting of resources.

Chronic pain is defined as pain that persists beyond that of normal tissue healing time, usually considered to be 3 months[23] and may be classified as predominantly nociceptive, neuropathic, or nociplastic in origin.[27,35] Many causes of pain are common in both HICs and LMICs. However, compared with HICs, some types of CP are more common in LMICs, such as pain resulting from trauma, violence, and natural disasters[17] or pain associated with human immunodeficiency virus/acquired immune deficiency syndrome, herpes zoster, leprosy, and sickle cell disease,[36] which can be associated with an increased burden of chronic pain of predominantly neuropathic origin (CPOPNO).[33] Since its inception, the Global Burden of Disease study has reported consistently that the burden of pain in LMICs is substantial and that years lived with disability is high[33] and that, in Nepal, chronic, painful conditions comprise the 4 leading causes of years lived with disability.[54]

To date, 3 studies have examined the prevalence of CP in Nepal, reporting prevalence values of up to 50%.[2,5,54] However, none of these studies assessed factors associated with the presence of CP nor the prevalence and burden of CP due to neuropathic aetiologies. An additional important limitation of the previous epidemiological studies is the use of measurement instruments without rigorous cross-cultural adaptation and validation processes,[38] which are important when using patient-reported outcomes in clinical research.[30,46]

Given these considerations, understanding the prevalence and effect of CP in Nepal from different regions of Nepal is essential in quantifying the scale and nature of the problem and in highlighting the need for resource allocation and specialized care provision. In response, this study examined 3 objectives: (1) to estimate the prevalence of CP and CPOPNO in adults in all households in Ranipani, Baluwa, Nepal; (2) to characterize CP and CPOPNO and identify associations with sociodemographic characteristics; and (3) to examine pain catastrophizing, resilience, and the functional impact of CP and CPOPNO.

2. Materials and methods

2.1. Study design and setting

A cross-sectional study was conducted in one of the Village Development Committees in Bagmati Pradesh (Province 3) in Nepal. Bagmati Province is the most populated province among the 7 provinces of Nepal with a culturally diverse population of approximately 5.5 million. The study was conducted in the entire community of Ranipani, Baluwa (Kavrepalanchowk Disctrict). Demographic information, obtained from the Department of Community Programs, Dhulikhel Hospital and local Ward Office, reports that there are 210 households in Ranipani, Baluwa and a total population of 1115 (male = 559 and female = 556). The community has 2 health centres, and the principal occupation in the community is agriculture followed by animal rearing and trading.

2.2. Participants

All adult residents aged 18 years or older within each household in Ranipani, Baluwa were invited to participate. All persons meeting the eligibility criteria were included in the study. Eligibility was conferred where individuals were (1) available for contact; (2) able to speak and understand Nepali; (3) Nepali citizens; and (4) suffering from no physical or mental health issues that impaired ability to give informed consent (eg, dementia).

2.3. Materials

A study-specific questionnaire was designed, comprising 3 sections: demographic characteristics; screening (to identify CP); and pain-related information. The demographics section of the questionnaire elicited information concerning the following: age; gender; marital status; religion; caste; educational status; occupation; and smoking status. The screening section of the questionnaire was used to determine participant eligibility for inclusion in the study, as described above. Pain-related information focused on the duration, locus, nature and cause of pain and any treatments received for painful conditions. The remainder of the instruments are described in **Table 1**. Neuropathic pain is defined as "pain caused by a lesion or disease of the somatosensory nervous system,"[24] and nonneuropathic pain is considered to be predominantly nociceptive in origin.

2.4. Procedure

A systematic door-to-door strategy was used to recruit eligible participants. All information was obtained from participants through interviews with Bachelor of Physiotherapy students in their final year of study at the Kathmandu University School of Medical Sciences. They were trained in sampling, screening, data collection, and data entry before commencing the project.

All participants provided sociodemographic information and responded to 3 demographic and pain-related questions: (1) "Do you speak and understand Nepali?"; (2) "Are you a Nepali citizen?"; and (3) "Do you have pain lasting for at least 3 months?" Chronic pain was identified in those who responded in the affirmative to the third question, and the participants who responded affirmatively to all 3 questions went on to complete the remainder of the instruments.

Participants completed the self-report version of the Leeds Assessment of Neuropathic Symptoms and Signs pain scale (S-LANSS)[4] with the aim of determining the prevalence of CPOPNO. The S-LANSS was translated into Nepali, and back-translated into English, using recommended guidelines,[3] and the findings are reported by Sharma et al.,[37] who conducted their research on the population examined in this study. Participants completed the S-LANSS Numerical Pain Rating Scale (NPRS), irrespective of whether their pain was associated with neuropathic, nociceptive, or nociplastic features. Participants also completed the Nepali versions of the 3-item Pain Catastrophizing Scale (PCS-3,[9] translated into Nepali by Sharma et al.[41]); the 2-item Connor Davidson Resilience Scale (CD-RISC-2,[50] translated into Nepali by Sharma et al.[39]); and the 4 PROMIS Domain Short Form questionnaires (pain intensity, pain interference, sleep disturbance, and depression; http://www.healthmeasures.net/promis-scoring-manuals), which were translated into Nepali by Sharma et al.[37,40] Information obtained from participants was managed at the Department of Physiotherapy, Dhulikhel Hospital, Kathmandu University Hospital. All data were pseudoanonymized, entered into password-protected computerized databases, and transferred electronically, in a secure manner, to the University of Dundee for statistical analysis.

2.5. Statistical considerations

The Statistics Package for Social Sciences (SPSS; v26) was used to undertake all statistical analyses. The majority of the reported

Table 1

Standardised instruments used in this study.

Name of instrument	Construct assessed	No. of items	Scale score range (cut point)	Subscale(s)	Subscale score range (cut point)	Internal consistency
S-LANSS[4]	Pain of predominantly neuropathic origin (POPNO)	7	0–24: higher scores indicate greater likelihood of POPNO (≥12)	N/A	N/A	$\alpha = 0.801$
NPRS	Pain intensity	1	0–10: higher scores indicate greater symptom severity ("mild" ≤3; "moderate" 4–7; "severe" >7[58])	N/A	N/A	$\alpha = 0.879$
PCS-3[9] (Constructed from the original 13-item scale[45])	Exaggerated negative orientation toward noxious stimuli	3	0–12: higher scores indicate greater symptom severity (N/A)	Rumination Magnification Helplessness	0–4 (N/A) 0–4 (N/A) 0–4 (N/A)	$\alpha = 0.786$
CD-RISC 2[50] (cross-culturally validated[39])	Resilience—the personal qualities that enable one to thrive in the face of adversity	2	0–8: higher scores indicate greater resilience* (N/A)	N/A	N/A	$\alpha = 0.550$
PROMIS scale v1.0—pain intensity 3a† (cross-culturally validated[40])	Pain intensity	3	3–15: higher scores indicate greater symptom severity‡ (N/A)	N/A	N/A	$\alpha = 0.576$
PROMIS short form v1.0—pain interference 6b† (cross-culturally validated[40])	Pain interference	6	6–30: higher scores indicate greater symptom severity‡ (N/A)	N/A	N/A	$\alpha = 0.869$
PROMIS short form v1.0—sleep disturbance 4a† (cross-culturally validated[40])	Sleep disturbance	4	4–20: higher scores indicate greater symptom severity‡ (N/A)	N/A	N/A	$\alpha = 0.564$
PROMIS depression 4a -adult v1.0† (cross-culturally validated[40])	Depression	4	4–20: higher scores indicate greater symptom severity‡ (N/A)	N/A	N/A	$\alpha = 0.881$

* Standardised scores were computed, in accordance with the scoring instructions, and standardised scores were compared with a US general population mean of 6.91.[50]
† PROMIS instruments were authored by each relevant PROMIS domain group.
‡ Standardized T-scores are provided for total scores for each of the PROMIS domains, enabling comparisons with the general population and several clinical populations (in the United States). Comparator populations have an average score of 50, with a standard deviation of 10, as advised in each of the PROMIS manuals. PROMIS manuals can be found at http://www.healthmeasures.net/promis-scoring-manuals.
CD-RISC 2, Connor-Davidson Resilience Scale; NPRS, numeric pain rating scale; PCS-3, 3-item version of the Pain Catastrophizing Scale; PROMIS, patient reported outcome measurement information system; S-LANSS, self-report version of the Leeds Assessment of Neuropathic Symptoms and Signs pain scale.

findings are descriptive and are presented as number and percentage (n, %), mean and standard deviation ($\bar{x}$, σ), or median and interquartile range (IQR). Where subgroup statistical comparisons were made, these were achieved using either Pearson χ^2 test (in the case of categorical dependent variables) or univariate analysis of variance (in the case of continuous dependent variables). Associations between sociodemographic characteristics and CP (and CPOPNO) were examined using univariate and multiple logistic regression. In addition to unadjusted values, adjusted odds ratios are presented, whereby each sociodemographic characteristic was adjusted by all other independently significant sociodemographic characteristics in a multiple logistic regression model.

Correlational analyses were used to examine relationships between psychological characteristics (the PCS-3, assessing pain catastrophizing, and the CD-RISC-2, assessing resilience) and the 4 PROMIS domains. These relationships were assessed using the Pearson correlation coefficient (denoted by the letter p in populations and r in samples). Correlations were classified as being weak, moderate, or strong.[8] Comparator population means were available for the CD-RISC 2 and the 4 PROMIS domains (pain intensity, pain interference, sleep disturbance, and depression), and comparisons were achieved through the use of standardized scoring techniques available for these instruments. Comparisons were made with available US populations, and they were compared with the study population using one-sample *t*-tests.

A power calculation was not required for this study because all eligible community inhabitants were approached and invited to participate.

2.6. Ethical approval

Ethical approval was granted by the Institutional Review Committee of the Kathmandu University School of Medical Sciences, Dhulikhel, Nepal (protocol approval number I2I/19). Written consent was provided by participants wherever possible, and, where this was not possible, participants gave oral consent, and a witness signed on their behalf.

3. Results

The recruitment process is shown in **Figure 1**.

Figure 1 shows that the final study cohort comprised 520 individuals. The point prevalence of CP was 53.3% (n = 277). The prevalence of CPOPNO was 12.7% (n = 66) in the entire study cohort and 22.8% in those with CP. Pain-related characteristics in those with CP and in those with CPOPNO compared with nonneuropathic pain (NonNeuP) are shown in **Table 2**.

3.1. Sociodemographic characteristics associated with chronic pain

Associations between sociodemographic characteristics and CP (and CPOPNO) are shown in **Table 3**.

Table 3 shows that a higher risk of CP was associated with female gender and older age. Farmers and housewives were more likely to have CP than unemployed persons. Brahmins were more likely to have CP than those from the Tamang and Sherpa/Lama castes. Current smokers were more likely to have CP than those who had never smoked.

Figure 1. Identification of eligible study population.

The proportion of those with CP reporting a history of medical comorbidity is shown in **Figure 2**. Almost half of those with CP (47.7%; n = 132) reported a history of at least one other medical condition: 39.7% (n = 110) reported 1 medical condition; 7.2% (n = 20) reported 2 medical conditions; and 0.7% (n = 2) reported 3 medical conditions. **Figure 2** shows

Table 2

Pain-related characteristics in those with chronic pain and in those with chronic pain of predominantly neuropathic origin compared with nonneuropathic pain.

Variable	All participants with chronic pain (n = 277)		Subgroup analyses: participants with chronic pain of predominantly neuropathic origin (CPOPNO) vs participants with nonneuropathic pain (Non-NeuP)				
			CPOPNO (n = 66)		Non-NeuP (n = 211)		P (ω/η_p^2)
	Value	% or variability	Value	% or variability	Value	% or variability	
Median duration of pain at assessment (mo)	21	IQR = 36	Mean = 33	SD = 35	Mean = 38	SD = 49	0.432 (0.002)
Median duration of current episode of pain (mo)	12	IQR = 21	Mean = 19	SD = 23	Mean = 19	SD = 34	0.969 (<0.001)
Pain intensity (n, %)							<0.001 (0.244)
Mild to moderate	236	85.2%%	46	69.7%	190	90.0%	
Severe	41	14.8%	20	30.3%	21	10.0%	
Constant pain (n, %)	170	61.4%	43	65.2%	127	60.2%	0.470 (0.43)
Left or been absent from work for ≥1 mo due to pain (n, %)	75	27.1%	16	24.2%	59	28.0%	0.553 (0.036)
Cause of pain (n, %)							0.132 (0.188)
Accidents	82	29.6%	26	39.4%	56	26.5%	
Medical conditions	53	19.1%	8	12.1%	45	21.3%	
Postsurgical	9	3.2%	1	1.5%	8	3.8%	
Congenital	3	1.1%	0	0%	3	1.4%	
Multiple causes	2	0.7%	0	0%	2	0.9%	
Other	80	28.9%	23	34.8%	57	27.0%	
Do not know	48	17.3%	8	12.1%	40	19.0%	

IQR, interquartile range.

Table 3

Sociodemographic risk factors for chronic pain (vs no chronic pain) and chronic pain of predominantly neuropathic origin (vs nonneuropathic pain).

Explanatory variable	Reference	Chronic pain (vs no chronic pain)			*P*-value	Chronic pain of predominantly neuropathic origin (vs nonneuropathic pain)			*P*-value
		OR_{unadj}	OR_{adj}	95% CI		OR_{unadj}	OR_{adj}	95% CI	
Gender									
Male	Female	0.73	**0.49**	**0.31–0.76**	**0.002**	1.03	1.08	0.60–1.97	0.802
Age*	1-y increment	**1.04**	**1.05**	**1.03–1.06**	**<0.001**	1.01	1.01	0.99–1.03	0.241
Marital status*†									
Married	Single	**1.72**	1.10	0.66–1.84	0.713	1.48	1.48	0.68–3.24	0.328
Divorced/other	Single	**13.73**	4.49	0.35–58.54	0.998	**4.67**	**4.67**	**1.11–19.57**	**0.035**
Religion*									
Hindu	Buddhist	**3.01**	1.16	0.42–3.23	0.774	0.30	0.29	0.07–1.18	0.083
Other	Buddhist	3.33	Insufficient number			0.33	0.60	0.05–6.77	0.678
Caste*									
Chhetri	Brahmin	0.77	0.70	0.32–1.50	0.357	2.58	2.31	0.86–6.18	0.096
Newar	Brahmin	0.78	0.70	0.38–1.30	0.259	1.59	1.58	0.71–3.53	0.264
Tamang	Brahmin	0.38	**0.12**	**0.03–0.53**	**0.005**	Insufficient number			
Rai/Limbu	Brahmin	0.35	0.33	0.05–2.20	0.253	Insufficient number			
Sherpa/Lama	Brahmin	**0.08**	**0.06**	**0.01–0.60**	**0.016**	Insufficient number			
Dalit	Brahmin	0.77	0.94	0.47–1.86	0.852	1.06	1.12	0.45–2.79	0.810
Other	Brahmin	0.64	0.72	0.39–1.30	0.275	0.61	0.63	0.22–1.78	0.385
Educational status*									
Primary level (≤ class 5)	Illiterate	0.95	1.40	0.84–2.35	0.196	1.07	1.01	0.53–1.94	0.977
Secondary level (classes 6–10)	Illiterate	**0.60**	1.19	0.62–2.27	0.605	0.46	0.51	0.18–1.41	0.191
High School (classes 11–12)	Illiterate	**0.23**	0.79	0.30–2.06	0.624	0.88	1.02	0.26–3.99	0.262
Higher education	Illiterate	0.29	0.90	0.80–10.11	0.931	Insufficient number			
Occupation*									
Farmer	Unemployed	1.17	**2.41**	**1.11–5.23**	**0.027**	0.92	0.89	0.31–2.54	0.823
Housewife	Unemployed	1.81	**4.04**	**1.25–13.04**	**0.019**	0.61	0.61	0.16–2.28	0.461
Businessman	Unemployed	0.81	1.03	0.22–4.81	0.969	1.29	1.31	0.30–5.82	0.721
Office worker	Unemployed	1.91	9.14	0.25–328	0.226	Insufficient number			
Student7	Unemployed	**0.09**	Insufficient number			2.83	6.00	0.18–196	0.314
Retired	Unemployed	0.96	Insufficient number			Insufficient number			
Other	Unemployed	1.67	14.03	0.60–329	0.101	0.47	0.36	0.03–3.90	0.404
Smoking status									
Current smoker	Never smoked	0.83	**1.74**	**1.02–2.97**	**0.043**	0.89	1.01	0.51–2.03	0.968

Odds ratios shown in bold were found to be statistically significant ($P \leq 0.05$).

* One or more of the univariate tests resulted in a significant ($P \leq 0.05$) unadjusted odds ratio predicting chronic pain (vs no chronic pain). These variables were entered as control variables, where appropriate, in multiple regression models to compute the associated adjusted odds ratios.

† One or more of the univariate tests resulted in a significant ($P \leq 0.05$) unadjusted odds ratio predicting chronic pain of predominantly neuropathic origin (vs chronic nonneuropathic pain). This variable was entered as control variables, where appropriate, in multiple regression models to compute the associated adjusted odds ratios.

that the most prevalent condition reported in medical histories was osteoarthritis.

Almost half (48.7%, n = 135) of those with CP had sought medical treatment for pain management, and less than 10% of the CP group had engaged with each of the other intervention modalities (surgical, physiotherapy, home treatments, yoga and pranayama, homeopathy, Ayurveda, traditional healing naturopathy, and "other" treatment types). A significantly higher proportion of the CPOPNO subgroup had received medical treatment compared with the NonNeuP subgroup (60.6% [n = 40] vs 45.0% [n = 95]; $\chi^2(1) = 4.89$; $P = 0.027$; $\omega = 0.133$). There were no other subgroup differences in the treatment reported. A total of 109 (39.4%) people with CP reported having undergone at least one type of clinical investigation as a result of their pain (x-ray, magnetic resonance imaging, computerized tomography scan, nerve conduction velocity test, blood test, or electromyography), and some participants had undergone more than one type of investigation. Around one-fifth (20.6%; n = 57) of those with CP had paid for treatment for their pain, and the median total cost of treatment was 7000 NPR (US $ = 58.55; IQR = 18,000 NPR). There were no significant subgroup differences concerning the proportion that paid for treatment or the reported cost of treatment received.

3.2. Catastrophizing, resilience, and the functional impact of chronic pain

The mean total score on the PCS-3 was 7.06 (SD = 2.12), which is substantially higher than the mean reported for a US sample of 305 adults with CP (mean = 3.28, SD = 0.91).[59] The mean subscale scores were as follows: rumination = 1.89 (SD = 0.94); magnification = 2.20 (SD = 0.80); and helplessness = 2.97 (SD = 0.79). The only subgroup difference was that the mean rumination subscale score was significantly higher in the CPOPNO subgroup (2.11 [SD = 0.88]) compared with the NonNeuP subgroup (1.82 [SD = 0.95]; $F(1) = 3.98$; $P = 0.033$; $\eta_p^2 = 0.016$). An examination of the relationships between the total PCS-3 score and each of the sociodemographic characteristics in those with CP revealed no significant overall associations. Similarly, there were no significant overall associations with subgroup.

The mean resilience score on the CD-RISC-2 was significantly lower in the CP group (6.43; SD = 0.96) compared with the available general population scores (6.91; SD = 1.5) ($t(276) = -8.44$; $P < 0.001$), falling at one-third of a standard deviation below that of the general population score (mean diff = −0.48;

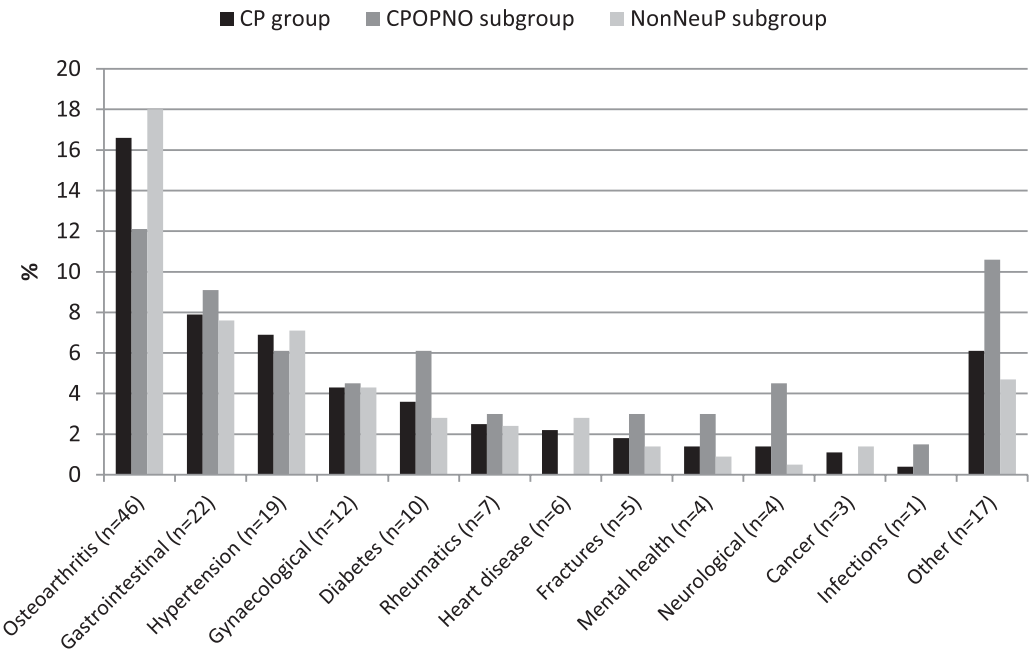

Figure 2. Percentage of people reporting a history of medical morbidity in the chronic pain (CP) group and in the chronic pain of predominantly neuropathic origin (CPOPNO) and nonneuropathic pain (NonNeuP) subgroups.

95% CI = −0.60 to −0.37). There were no significant subgroup differences. An examination of the relationships between resilience and each of the sociodemographic characteristics in those with CP revealed no significant associations. Furthermore, there were no significant associations between resilience and the sociodemographic characteristics in either of the subgroups.

The mean PROMIS pain intensity score in the CP group was significantly lower than that of the available US general population (t(276) = −4.819; $P < 0.001$; mean diff = −2.01; 95% CI = −2.83 to −1.19). Furthermore, the CPOPNO subgroup was associated with a higher mean pain intensity score compared with the NonNeuP subgroup: the CPOPNO subgroup mean did not differ from that of the US general population; however, the NonNeuP subgroup was associated with a lower mean score compared with the same comparator population (t(210) = −5.631; $P < 0.001$; mean diff = −5.63; 95% CI = −3.60 to −1.73). The mean PROMIS pain interference score in the study population was significantly higher than that of the general population (t(276) = 10.571; $P < 0.001$; mean diff = 4.45; 95% CI = 3.62 to −5.28). Both subgroup means were significantly higher than that of the general population: CPOPNO subgroup (t(65) = 8.239; $P < 0.001$; mean diff = 5.72; 95% CI = 4.33–7.10); and NonNeuP subgroup (t(210) = 8.014; $P < 0.001$; mean diff = 4.06; 95% CI = 3.06–5.06). The mean PROMIS sleep disturbance score in the study population did not differ significantly from that of the general population. There were no subgroup differences. The mean PROMIS depression score in the study population was significantly higher than that of the general population (t(276) = 5.205; $P < 0.001$; mean diff = 2.89; 95% CI = 1.79 to −3.98). Both subgroup means were significantly higher than that of the general population: CPOPNO subgroup (t(65) = 3.76; $P < 0.001$; mean diff = 3.56; 95% CI = 1.67–5.45) and NonNeuP subgroup (t(210) = 4.022; $P < 0.001$; mean diff = 2.67; 95% CI = 1.36–3.99).

Further analyses were undertaken examining associations between the 4 PROMIS domains and the sociodemographic characteristics (age, gender, marital status, religion, caste, educational status, and occupation). Significant associations were found in the CP group between: age group and pain interference ($r = 0.23$; n = 277; $P < 0.001$); age group and sleep disturbance ($r = 0.14$; n = 277; $P = 0.024$); and age group and depression ($r = 0.19$; n = 277; $P = 0.002$). Pairwise comparisons, with a Bonferroni correction, were run to examine differences between the levels of the age group–independent variable. Older adults reported greater pain interference than both mid adults (mean diff = 2.68; $P = 0.002$) and younger adults (mean diff = 4.3; $P = 0.001$); and higher depression scores than both mid adults (mean diff = 1.75; $P = 0.016$) and younger adults (mean diff = 2.74; $P = 0.014$). On repeating these analyses in the CPOPNO subgroup, a significant association was found between age group and pain interference ($r = 0.30$; n = 66; $P = 0.014$), whereby older adults reported greater pain interference than mid adults (mean diff = 3.59; $P = 0.041$). There were no other significant associations between sociodemographic characteristics and the 4 PROMIS domains in the CP group or the CPOPNO subgroup.

There were no significant associations between the 4 PROMIS domains and pain catastrophizing or resilience.

4. Discussion

We found a high prevalence of both CP and CPOPNO in the cohort. Of those with CP, the majority reported having pain of moderate severity, and more than one-quarter reported having left work or been absent from work for at least one month as a consequence of pain. Adjusting for relevant sociodemographic characteristics, CP was associated with the female gender, older age, farmers and housewives (compared with unemployed persons), and the Brahmin caste (compared with the Tamang and Sherpa/Lama castes). There was a substantially higher prevalence of a history of osteoarthritis than of any other medical condition. Almost half of those with CP had sought medical treatment for pain management, and only a small proportion sought treatment involving traditional healing techniques. Around

one-fifth of those with CP had paid for treatment for their pain, and the median total cost of treatment in those who had paid for it was 7000 NPR (US $ = 58.55), which falls at approximately 13.3% of one national average month's salary.[7] The mean resilience score and the standardized mean pain intensity score were found to be significantly lower in the CP group compared with the US general population. The standardized mean pain interference and depression scores were significantly higher than that of the US general population. The mean pain catastrophizing score was higher than that of a US sample of adults with CP. Further analyses showed that older adults reported greater pain interference and higher depression scores.

The 53.3% prevalence of CP amongst Nepali people, reported in this study, is similar to that reported by Bhattarai et al.[5] and Walters et al.[55] but substantially higher than that reported by Baxter.[2] There is a need for robust larger-scale studies examining the prevalence and effect of CP in Nepal to validate the findings of this study, to identify the risk factors associated with pain and disability, and to identify effective pain management strategies.

This is the first study to report the prevalence of CPOPNO in Nepal. Compared with clinical assessment, many instruments, including the LANSS, have been shown to underestimate the prevalence of neuropathic pain in community populations and estimates vary substantially depending on the instrument selected.[56] The point prevalence estimate reported in this study (12.7%) is slightly higher than that reported for other countries. A systematic review of neuropathic pain in the general population[52] reported that the point prevalence is likely to fall between 6.9% and 10%, confirmed by a further study using the LANSS[56] reporting a prevalence of 8.8%. VanDenKerkhof et al.[51] reported a lower point prevalence of 5.8% using the S-LANSS.However, there is a paucity of information concerning the prevalence of neuropathic pain in LMICs. To the authors' knowledge, only one study to date has examined the prevalence of neuropathic pain in an LMIC using these instruments. Elzahaf et al.[12] interviewed 1212 randomly sampled adults from 3 urban areas in Libya using an Arabic translation of the S-LANSS. They reported a 3.9% point prevalence estimate of neuropathic pain, which is considerably lower than was found in this study. Given that there are likely to be differences in prevalence estimates arising through survey questionnaires and specialist clinical assessment,[56] there is a need to validate the findings of this study in larger samples in Nepal with a view to informing effective health care policy and practice concerning the management of neuropathic pain.

The sociodemographic characteristics associated with CP—female gender, older age and relatively heavy manual labour occupations—were similar to those reported in the wider literature from other countries.[1,10,18,28,34] However, our findings are the first Nepali data for comparison and, furthermore, they show an association between CP and the Brahmin caste. It is beyond the scope of this review to explain this finding, and it is important to further evaluate the role of sociodemographic characteristics on the experience and impact of pain within the context of Nepali culture. The most prevalent condition in the participants' medical histories was osteoarthritis, concurring with the findings of Walters et al.[55] This condition is particularly prevalent in individuals engaged in heavy manual work[20] and, in particular, in agricultural workers.[26,47] The nature of work is particularly regional in LMICs so, in addition to studies characterizing pain and identifying need in local or regional populations, there is a need for robust large-scale studies undertaken at national level.

The study cohort was shown to have significantly lower resilience scores than those found in the US general population. This is an important finding because resilience is thought to be one of the key factors in successful adaptation to CP.[46,59] However, it is difficult to draw conclusions from this finding because the comparator population was drawn from the US rather than from Nepal, and ethnic differences in the prevalence and experience of pain are widely reported.[6] Although pain interference and depression scores were statistically significantly higher in this cohort than in the general US population, they fell less than one standard deviation from population norms, so this may be of little clinical relevance. It is unsurprising that pain interference is slightly higher in this cohort than in the comparator Western sample because the principal occupation in this geographic area involves heavy manual labour (ie, agriculture). A Nepali mental health policy was adopted in 1997 but is not yet fully operationalised.[29] Misconceptions and stigma may impede the identification of depression and other mental health problems in Nepal and other LMICs.[29] Given the present finding, this is an important area for further development. By contrast, the Nepali cohort reported a significantly lower mean pain intensity score than that of the US general population. Pain threshold and pain intensity are reported to be influenced by race and ethnicity,[14,31] and comparison with the general population of another country may be meaningless. Collection of these data from nationally representative samples in Nepal and other LMICs could help advance our understanding of the role of ethnicity in the experience and impact of CP.

4.1. Limitations

The principal limitation of this study relates to the generalizability of the findings because the geographical location is relatively rural and located within Nepal's Province 3. In consequence, the findings may not be representative of Nepal as a whole. Furthermore, similar to other studies conducted in Nepal, as a result of the nature of the country's geography and infrastructure, the sample size in this study is relatively small. In addition, the relatively high proportion of people ineligible to participate due to limiting illness may have resulted in an underestimation of the prevalence of CP; however, further research is required to confirm and quantify this. Finally, screening instruments have a limited capacity to detect neuropathic pain compared with clinical assessment. In consequence, we could not determine if any pain that was associated with a positive S-LANSS score occurred in a neuroanatomically logical distribution and might, therefore, fulfil a formal definition of "possible neuropathic pain."[15] However, this is a systemic issue, associated with all screening instruments designed to identify the presence of neuropathic pain without clinical assessment.

5. Conclusions

Our findings support a high prevalence of CP and CPOPNO in Nepal, largely consistent with prevalence in other countries. The impact of CP was shown to be considerable, with almost two-thirds having reported the presence of constant pain and more than one-quarter having reported absence from work for at least one month as a consequence of pain. Probable neuropathic pain was associated with greater pain severity. Using standardized scoring techniques, compared with population estimates from other countries, those with CP were associated with lower pain intensity and resilience scores and higher pain catastrophizing, pain interference, and depression scores. In contrast to the present sample, the standardized scoring techniques associated with these instruments have produced data for comparator

populations living in high-income countries. Although several research instruments have been translated and validated in Nepali, the paucity of available comparator populations remains a significant challenge. Perhaps, the most substantial challenge is the nature of Nepal's geography and infrastructure, which make population-wide surveys, including longitudinal studies, difficult to achieve currently. However, this study has demonstrated, using data from one of the 7 provinces, the feasibility of conducting large-scale epidemiological studies in Nepal despite these challenges.

Disclosures

The authors have no conflict of interest to declare.

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References

[1] Bartley EJ, Fillingim RB. Sex differences in pain: a brief review of clinical and experimental findings. Br J Anaesth 2013;111:52–8.
[2] Baxter K. Abstract PR284: pain in Nepal: analysis of prevalence, impact and treatment in the Kathmandu district. Anesth Analg 2016;123:367.
[3] Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine (Phila Pa 1976) 2000;25:3186–91.
[4] Bennett MI, Smith BH, Torrance N, Potter J. The S-LANSS score for identifying pain of predominantly neuropathic origin: validation for use in clinical and postal research. J Pain 2005;6:149–58.
[5] Bhattarai B, Pokhrel PK, Tripathi M, Rahman TR, Baral DD, Pande R, Bhattachaya A. Chronic pain and cost: an epidemiological study in the communities of Sunsari district of Nepal. Nepal Med Coll J 2007;9:6–11.
[6] Campbell CM, Edwards RR. Ethnic differences in pain and pain management. Pain Manag 2012;2:219–30.
[7] CEIC 2020. Nepal average monthly household income: Whole Kingdom, 2020. CEIC Data: London. Available at: https://www.ceicdata.com/en/nepal/household-budget-survey-average-monthly-household-income/average-monthly-household-income-whole-kingdom. Accessed April 11, 2020.
[8] Cohen JA. A power primer. Psychol Bull 1992;112:155–9.
[9] Darnall BD, Sturgeon JA, Cook KF, Taub CJ, Roy A, Burns JW, Sullivan M, Mackey SC. Development and validation of a daily pain catastrophizing scale. J Pain 2017;18:1139–49.
[10] de Moraes Vieiral EB, Santos Garcia JB, Moura da Silva AA, Mualen Araújo RLT, Silva Jansen RC, Xavier Bertrand AL. Chronic pain, associated factors, and impact on daily life: are there differences between the sexes? Cad Saúde Pública 2012;28:1459–67.
[11] Dueñas M, Ojeda B, Salazar A, Mico JA, Failde I. A review of chronic pain impact on patients, their social environment and the health care system. J Pain Res 2016;9:457–67.
[12] Elzahaf RA, Johnson MI, Tashani OA. The epidemiology of chronic pain in Libya: a cross-sectional telephone survey. BMC Public Health 2016;16:776.
[13] Elzahaf RA, Tashani OA, Unsworth BA, Johnson MI. The prevalence of chronic pain with an analysis of countries with a Human Development Index less than 0.9: a systematic review without meta-analysis. Curr Med Res Opin 2012;28:1221–9.
[14] Fabian LA, McGuire L, Goodin BR, Edwards RR. Ethnicity, catastrophizing, and qualities of the pain experience. Pain Med 2011;12:314–21.
[15] Finnerup NB, Haroutounian S, Kamerman P, Baron R, Bennett DL, Bouhassira D, Cruccu G, Freeman R, Hansson P, Nurmikko T, Raja SN, Rice AS, Serra J, Smith BH, Treede RD, Jensen TS. Neuropathic pain: an updated grading system for research and clinical practice. PAIN 2016;157:1599–606.
[16] Fransen M, Woodward M, Norton R, Coggan C, Dawe M, Sheridan N. Risk factors associated with the transition from acute to chronic occupational back pain. Spine (Phila Pa 1976) 2002;27:92–8.
[17] GBD 2017 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet 2018;392:1789–858.
[18] Gomez CJ, Herman AC, Parigi P. Leading countries in global science increasingly receive more citations than other countries doing similar research. Nat Hum Behav 2022;6:919–29.
[19] Hadi MA, McHugh GA, Closs SJ. Impact of chronic pain on patients' quality of life: a comparative mixed-methods study. J Patient Exp 2019;6:133–41.
[20] Harris EC, Coggon D. Hip osteoarthritis and work. Best Pract Res Clin Rheumatol 2015;29:462–82.
[21] Harstall C, Ospina M. How prevalent is chronic pain? Pain Clin Updates 2003;11:1–4.
[22] High Quality Technical Assistance for Results (HEART). Research capacity strengthening in LMICs: a rapid evidence assessment, 2019. Available at: https://assets.publishing.service.gov.uk/media/5d42be4eed915d09d8945db9/SRIA_-_REA_final__Dec_2019_Heart___003_.pdf. Accessed November 1, 2022.
[23] International Association for the Study of Pain (IASP; 1994). Task force on taxonomy of the international association for the study of pain. In: Merskey H, Bogduk N, editors. Descriptions of chronic pain syndromes and definitions of pain terms. Seattle, Wash: IASP Press, 1994.
[24] International Association for the Study of Pain (IASP). IASP taxonomy. Pain terms. Neuropathic pain, 2017. Available at: www.iasp-pain.org/Taxonomy#Neuropathicpain. Accessed November 1, 2022.
[25] Jackson T, Thomas S, Stabile V, Han X, Shotwell M, McQueen K. Prevalence of chronic pain in low-income and middle income countries: a systematic review and meta-analysis. Lancet 2015;385:S10.
[26] Kirkhorn S, Greenlee RT, Reeser JC. The epidemiology of agriculture-related osteoarthritis and its impact on occupational disability. WMJ 2003;102:38–44.
[27] Kosek E, Clauw D, Nijs J, Baron R, Gilron I, Harris RE, Mico JA, Rice ASC, Sterling M. Chronic nociplastic pain affecting the musculoskeletal system: clinical criteria and grading system. PAIN 2021;162:2629–34.
[28] Latza U, Pfahlberg A, Gefeller O. Impact of repetitive manual materials handling and psychosocial work factors on the future prevalence of chronic low-back pain among construction workers. Scand J Work Environ Health 2002;28:314–23.
[29] Luitel NP, Jordans MD, Adhikari A, Upadhaya N, Hanlon C, Lund C, Komproe IH. Mental health care in Nepal: current situation and challenges for development of a district mental health care plan. Confl Health 2015;9:3.
[30] Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, Bouter LM, de Vet HCW. The COSMIN checklist for assessing the methodological quality of studies on measurement properties of health status measurement instruments: an international Delphi study. Qual Life Res 2010;19:539–49.
[31] Park J, Engstrom G, Tappen R, Ouslander J. Health-related quality of life and pain intensity among ethnically diverse community-Dwelling older adults. Pain Manag Nurs 2015;16:733–42.
[32] Patel AS, Farquharson R, Carroll D, Moore A, Phillips CJ, Taylor RS, Barden J. The impact and burden of chronic pain in the workplace: a qualitative systematic review. Pain Pract 2012;12:578–89.
[33] Rice ASC, Smith BH, Blyth FM. Pain and the global burden of disease. PAIN 2016;157:791–6.
[34] Rustøen T, Wahl AK, Hanestad BR, Lerdal A, Paul S, Miaskowski C. Age and the experience of chronic pain: differences in health and quality of life among younger, middle-aged, and older adults. Clin J Pain 2005;21:513–23.
[35] Scholz J. Mechanisms of chronic pain. Mol Pain 2014;10(suppl 1):O15.
[36] Sharma S, Blyth FM, Mishra SR, Briggs AM. Health system strengthening is needed to respond to the burden of pain in low- and middle-income countries and to support healthy ageing. J Glob Health 2019;9:020317.
[37] Sharma S, Correia H, Pathak A, Terwee CB, Abbott JH, Maharjan R, Sharma S, Sharma J, Maharjan S, Reed D, Jensen MP. Translation and cross-cultural adaptation of Nepali versions of the patient-reported outcomes measurement information system (PROMIS®) pain intensity, pain interference, pain behavior, depression, and sleep disturbance short forms in chronic musculoskeletal pain. Qual Life Res 2021;30:1215–24.
[38] Sharma S, Jensen MP, Pathak A, Sharma S, Pokharel M, Abbott JH. State of clinical pain research in Nepal: a systematic scoping review. PAIN Rep 2019b;4:e788.

[39] Sharma S, Pathak A, Abbott JH, Jensen MP. Measurement properties of the Nepali version of the Connor Davidson resilience scales in individuals with chronic pain. Health Qual Life Outcomes 2018;16:56.
[40] Sharma S, Pathak A, Maharjan R, Abbott JH, Correia H, Jensen M. Psychometric properties of Nepali versions of PROMIS short from measures of pain intensity, pain interference, pain behaviour, depressions, and sleep disturbance. J Pain 2018;19:S59.
[41] Sharma S, Thibault P, Abbott JH, Jensen MP. Clinimetric properties of the Nepali version of the Pain Catastrophizing Scale in individuals with chronic pain. J Pain Res 2018;11:265–76.
[42] Smith B, Torrance N. Epidemiology of chronic pain. In: Mcquay H, Kalso E, Moore R, editors. Systematic reviews in pain research: methodology refined. Seattle: IASP, 2008. p. 1–4.
[43] Smith D, Wilkie R, Croft P, Parmar S, McBeth J. Pain and mortality: mechanisms for a relationship. PAIN 2018;159:1112–8.
[44] Sturgeon JA, Zautra AJ. Resilience: a new paradigm for adaptation to chronic pain. Curr Pain Headache Rep 2010;14:105–12.
[45] Sullivan MJL, Bishop SR, Pivik J. The pain catastrophizing scale: development and validation. Psychol Assess 1995;7:524–32.
[46] Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, Bouter LM, de Vet HC. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol 2007;60: 34–42.
[47] Thelin A, Vingård E, Holmberg S. Osteoarthritis of the hip joint and farm work. Am J Ind Med 2004;45:202–9.
[48] Treede RD, Rief W, Barke A, Aziz Q, Bennett MI, Benoliel R, Cohen M, Evers S, Finnerup NB, First MB, Giamberardino MA, Kaasa S, Korwisi B, Kosek E, Lavand'homme P, Nicholas M, Perrot S, Scholz J, Schug S, Smith BH, Svensson P, Vlaeyen JWS, Wang SJ. Chronic pain as a symptom or a disease: the IASP classification of chronic pain for the international classification of diseases (ICD-11). PAIN 2019;160:19–27.
[49] United Nations development programme: human development report 2009. Overcoming barriers: human mobility and development. New York United Nations development programme, 2009. Available at: http://hdr.undp.org/en/media/HDR_2009_EN_Complete.pdf. Accessed December 24, 2021.
[50] Vaishnavi S, Connor K, Davidson JR. An abbreviated version of the Connor-Davidson Resilience Scale (CD-RISC), the CD-RISC2: psychometric properties and applications in psychopharmacological trials. Psychiatry Res 2007;152:293–97.
[51] VanDenKerkhof EG, Mann EG, Torrance N, Smith BH, Johnson A, Gilron I. An epidemiological study of neuropathic pain Symptoms in Canadian adults. Pain Res Manag 2016;2016:9815750.
[52] van Hecke O, Austin SK, Khan RA, Smith BH, Torrance N. Neuropathic pain in the general population: a systematic review of epidemiological studies. PAIN 2014;155:654–62.
[53] Verhaak PF, Kerssens JJ, Dekker J, Sorbi MJ, Bensing JM. Prevalence of chronic benign pain disorder among adults: a review of the literature. PAIN 1998;77:231–9.
[54] Vos T, Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, Abdulkader RS, Abdulle AM, Abebo TA, Abera SF, Aboyans V, Abu-Raddad LJ, Ackerman IN, Adamu AA, Adetokunboh O, Afarideh M, Afshin A, Agarwal SK, Aggarwal R, Agrawal A, Agrawal S, Ahmadieh H, Ahmed MB, Aichour MTE, Aichour AN, Aichour I, Aiyar S, Akinyemi RO, Akseer N, Al Lami FH, Alahdab F, Al-Aly Z, Alam K, Alam N, Alam T, Alasfoor D, Alene KA, Ali R, Alizadeh-Navaei R, Alkerwi A, Alla F, Allebeck P, Allen C, Al-Maskari F, Al-Raddadi R, Alsharif U, Alsowaidi S, Altirkawi KA, Amare AT, Amini E, Ammar W, Amoako YA, Andersen HH, Antonio CAT, Anwari P, Ärnlöv J, Artaman A, Aryal KK, Asayesh H, Asgedom SW, Assadi R, Atey TM, Atnafu NT, Atre SR, Avila-Burgos L, Avokphako EFGA, Awasthi A, Bacha U, Badawi A, Balakrishnan K, Banerjee A, Bannick MS, Barac A, Barber RM, Barker-Collo SL, Bärnighausen T, Barquera S, Barregard L, Barrero LH, Basu S, Battista B, Battle KE, Baune BT, Bazargan-Hejazi S, Beardsley J, Bedi N, Beghi E, Béjot Y, Bekele BB, Bell ML, Bennett DA. , Bensenor IM, Benson J, Berhane A, Berhe DF, Bernabe E, Betsu BD, Beuran M, Beyene AS, Bhala N, Bhansali A, Bhatt S, Bhutta ZA, Biadgilign S, Bicer BK, Bienhoff K, Bikbov B, Birungi C, Biryukov S, Bisanzio D, Bizuayehu HM, Boneya DJ, Boufous S, Bourne RRA, Brazinova A, Brugha TS, Buchbinder R, Bulto LNB, Bumgarner BR, Butt ZA, Cahuana-Hurtado L, Cameron E, Car M, Carabin H, Carapetis JR, Cardenas R, Carpenter DO, Carrero JJ, Carter A, Carvalho F, Casey DC, Caso V, Castaneda-Orjuela CA, Castle CD, Catala-Lopez F, Chang HY, Chang JC, Charlson FJ, Chen H, Chibalabala M, Chibueze CE, Chisumpa VH, Chitheer AA, Christopher DJ, Ciobanu LG, Cirillo M, Colombara D, Cooper C, Cortesi PA, Criqui MH, Crump JA, Dadi AF, Dalal K, Dandona L, Dandona R, das Neves J, Davitoiu DV, de Courten B, De Leo DD, Defo BK, Degenhardt L, Deiparine S, Dellavalle RP, Deribe K, Des Jarlais DC, Dey S, Dharmaratne SD, Dhillon PK, Dicker D, Ding EL, Djalalinia S, Do HP, Dorsey ER, dos Santos KPB, Douwes-Schultz D, Doyle KE, Driscoll TR, Dubey M, Duncan BB, El-Khatib ZZ, Ellerstrand J, Enayati A, Endries AY, Ermakov SP, Erskine HE, Eshrati B, Eskandarieh S, Esteghamati A, Estep K, Fanuel FBB, Farinha CSES, Faro A, Farzadfar F, Fazeli MS, Feigin VL, Fereshtehnejad SM, Fernandes JC, Ferrari AJ, Feyissa TR, Filip I, Fischer F, Fitzmaurice C, Flaxman AD, Flor LS, Foigt N, Foreman KJ, Franklin RC, Fullman N, Furst T, Furtado JM, Futran ND, Gakidou E, Ganji M, Garcia-Basteiro AL, Gebre T, Gebrehiwot TT, Geleto A, Gemechu BL, Gesesew HA, Gething PW, Ghajar A, Gibney KB, Gill PS, Gillum RF, Ginawi IAM, Giref AZ, Gishu MD, Giussani G, Godwin WW, Gold AL, Goldberg EM, Gona PN, Goodridge A, Gopalani SV, Goto A, Goulart AC, Griswold M, Gugnani HC, Gupta R, Gupta R, Gupta T, Gupta V, Hafezi-Nejad N, Hailu GB, Hailu AD, Hamadeh RR, Hamidi S, Handal AJ, Hankey GJ, Hanson SW, Hao Y, Harb HL, Hareri HA, Haro JM, Harvey J, Hassanvand MS, Havmoeller R, Hawley C, Hay SI, Hay RJ, Henry NJ, Heredia-Pi IB, Hernandez JM, Heydarpour P, Hoek HW, Hoffman HJ, Horita N, Hosgood HD, Hostiuc S, Hotez PJ, Hoy DG, Htet AS, Hu G, Huang H, Huynh C, Iburg KM, Igumbor EU, Ikeda C, Irvine CMS, Jacobsen KH, Jahanmehr N, Jakovljevic MB, Jassal SK, Javanbakht M, Jayaraman SP, Jeemon P, Jensen PN, Jha V, Jiang G, John D, Johnson SC, Johnson CO, Jonas JB, Jurisson M, Kabir Z, Kadel R, Kahsay A, Kamal R, Kan H, Karam NE, Karch A, Karema CK, Kasaeian A, Kassa GM, Kassaw NA, Kassebaum NJ, Kastor A, Katikireddi SV, Kaul A, Kawakami N, Keiyoro PN, Kengne AP, Keren A, Khader YS, Khalil IA, Khan EA, Khang YH, Khosravi A, Khubchandani J, Kiadaliri AA, Kieling C, Kim YJ, Kim D, Kim P, Kimokoti RW, Kinfu Y, Kisa A, Kissimova-Skarbek KA, Kivimaki M, Knudsen AK, Kokubo Y, Kolte D, Kopec JA, Kosen S, Koul PA, Koyanagi A, Kravchenko M, Krishnaswami S, Krohn KJ, Kumar GA, Kumar P, Kumar S, Kyu HH, Lal DK, Lalloo R, Lambert N, Lan Q, Larsson A, Lavados PM, Leasher JL, Lee PH, Lee JT, Leigh J, Leshargie CT, Leung J, Leung R, Levi M, Li Y, Li Y, Li Kappe D, Liang X, Liben ML, Lim SS, Linn S, Liu PY, Liu A, Liu S, Liu Y, Lodha R, Logroscino G, London SJ, Looker KJ, Lopez AD, Lorkowski S, Lotufo PA, Low N, Lozano R, Lucas TCD, Macarayan ERK, Magdy Abd El Razek H, Magdy Abd El Razek M, Mahdavi M, Majdan M, Majdzadeh R, Majeed A, Malekzadeh R, Malhotra R, Malta DC, Mamun AA, Manguerra H, Manhertz T, Mantilla A, Mantovani LG, Mapoma CC, Marczak LB, Martinez-Raga J, Martins-Melo FR, Martopullo I, Marz W, Mathur MR, Mazidi M, McAlinden C, McGaughey M, McGrath JJ, McKee M, McNellan C, Mehata S, Mehndiratta MM, Mekonnen TC, Memiah P, Memish ZA, Mendoza W, Mengistie MA, Mengistu DT, Mensah GA, Meretoja TJ, Meretoja A, Mezgebe HB, Micha R, Millear A, Miller TR, Mills EJ, Mirarefin M, Mirrakhimov EM, Misganaw A, Mishra SR, Mitchell PB, Mohammad KA, Mohammadi A, Mohammed KE, Mohammed S, Mohanty SK, Mokdad AH, Mollenkopf SK, Monasta L, Montico M, Moradi-Lakeh M, Moraga P, Mori R, Morozoff C, Morrison SD, Moses M, Mountjoy-Venning C, Mruts KB, Mueller UO, Muller K, Murdoch ME, Murthy GVS, Musa KI, Nachega JB, Nagel G, Naghavi M, Naheed A, Naidoo KS, Naldi L, Nangia V, Natarajan G, Negasa DE, Negoi RI, Negoi I, Newton CR, Ngunjiri JW, Nguyen TH, Nguyen QL, Nguyen CT, Nguyen G, Nguyen M, Nichols E, Ningrum DNA, Nolte S, Nong VM, Norrving B, Noubiap JJN, O'Donnell MJ, Ogbo FA, Oh IH, Okoro A, Oladimeji O, Olagunju TO, Olagunju AT, Olsen HE, Olusanya BO, Olusanya JO, Ong K, Opio JN, Oren E, Ortiz A, Osgood-Zimmerman A, Osman M, Owolabi MO, Pa M, Pacella RE, Pana A, Panda BK, Papachristou C, Park EK, Parry CD, Parsaeian M, Patten SB, Patton GC, Paulson K, Pearce N, Pereira DM, Perico N, Pesudovs K, Peterson CB, Petzold M, Phillips MR, Pigott DM, Pillay JD, Pinho C, Plass D, Pletcher MA, Popova S, Poulton RG, Pourmalek F, Prabhakaran D, Prasad NM, Prasad N, Purcell C, Qorbani M, Quansah R, Quintanilla BPA, Rabiee RHS, Radfar A, Rafay A, Rahimi K, Rahimi-Movaghar A, Rahimi-Movaghar V, Rahman MHU, Rahman M, Rai RK, Rajsic S, Ram U, Ranabhat CL, Rankin Z, Rao PC, Rao PV, Rawaf S, Ray SE, Reiner RC, Reinig N, Reitsma MB, Remuzzi G, Renzaho AMN, Resnikoff S, Rezaei S, Ribeiro AL, Ronfani L, Roshandel G, Roth GA, Roy A, Rubagotti E, Ruhago GM, Saadat S, Sadat N, Safdarian M, Safi S, Safiri S, Sagar R, Sahathevan R, Salama J, Saleem HOB, Salomon JA, Salvi SS, Samy AM, Sanabria JR, Santomauro D, Santos IS, Santos JV, Santric Milicevic MM, Sartorius B, Satpathy M, Sawhney M, Saxena S, Schmidt MI, Schneider IJC, Schottker B, Schwebel DC, Schwendicke F, Seedat S, Sepanlou SG, Servan-Mori EE, Setegn T, Shackelford KA, Shaheen A, Shaikh MA, Shamsipour M, Shariful Islam SM, Sharma J, Sharma R, She J, Shi P, Shields C, Shifa GT, Shigematsu M, Shinohara Y, Shiri R, Shirkoohi R, Shirude S, Shishani K, Shrime MG, Sibai AM, Sigfusdottir ID, Silva DAS, Silva JP, Silveira DGA, Singh JA, Singh NP, Sinha DN, Skiadaresi E, Skirbekk V, Slepak EL, Sligar A, Smith DL, Smith M, Sobaih BHA, Sobngwi E, Sorensen RJD, Sousa TCM, Sposato LA, Sreeramareddy CT, Srinivasan V, Stanaway JD, Stathopoulou V, Steel N, Stein MB, Stein DJ, Steiner TJ, Steiner C, Steinke S, Stokes MA, Stovner LJ, Strub B,

Subart M, Sufiyan MB, Sunguya BF, Sur PJ, Swaminathan S, Sykes BL, Sylte DO, Tabares-Seisdedos R, Taffere GR, Takala JS, Tandon N, Tavakkoli M, Taveira N, Taylor HR, Tehrani-Banihashemi A, Tekelab T, Terkawi AS, Tesfaye DJ, Tesssema B, Thamsuwan O, Thomas KE, Thrift AG, Tiruye TY, Tobe-Gai R, Tollanes MC, Tonelli M, Topor-Madry R, Tortajada M, Touvier M, Tran BX, Tripathi S, Troeger C, Truelsen T, Tsoi D, Tuem KB, Tuzcu EM, Tyrovolas S, Ukwaja KN, Undurraga EA, Uneke CJ, Updike R, Uthman OA, Uzochukwu BSC, van Boven JFM, Varughese S, Vasankari T, Venkatesh S, Venketasubramanian N, Vidavalur R, Violante FS, Vladimirov SK, Vlassov VV, Vollset SE, Wadilo F, Wakayo T, Wang YP, Weaver M, Weichenthal S, Weiderpass E, Weintraub RG, Werdecker A, Westerman R, Whiteford HA, Wijeratne T, Wiysonge CS, Wolfe CDA, Woodbrook R, Woolf AD, Workicho A, Xavier D, Xu G, Yadgir S, Yaghoubi M, Yakob B, Yan LL, Yano Y, Ye P, Yimam HH, Yip P, Yonemoto N, Yoon SJ, Yotebieng M, Younis MZ, Zaidi Z, Zaki MES, Zegeye EA, Zenebe ZM, Zhang X, Zhou M, Zipkin B, Zodpey S, Zuhlke LJ, Murray CJL. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet 2017;390:1211–59.

[55] Walters JL, Baxter K, Chapman H, Jackson T, Sethuramachandran A, Couldridge M, Joshi HR, Kundra P, Liu X, Nair D, Sullivan B, Shotwell MS, Jense RJ, Kassebaum NJ, McQueen KAK. Chronic pain and associated factors in India and Nepal: a pilot study of the vanderbilt global pain survey. Anesth Analg 2017;125:1616–26.

[56] Yawn BP, Wollan PC, Weingarten TN, Watson JC, Hooten WM, Melton LJ III. The prevalence of neuropathic pain: clinical evaluation compared with screening tools in a community population. Pain Med 2009;10:586–93.

[57] Yeung EWH, Arewasikporn A, Zautra AJ. Resilience and chronic pain. J Soc Clin Psychol 2012;31:593–617.

[58] Zelman DC, Dukes E, Brandenburg N, Bostrom A, Gore M. Identification of cut-points for mild, moderate and severe pain due to diabetic peripheral neuropathy. PAIN 2005;115:29–36.

[59] Ziadni MS, Sturgeon JA, Darnall BD. The relationship between negative metacognitive thoughts, pain catastrophizing, and adjustment to chronic pain. Eur J Pain 2018;22:756–62.