

Chronic pain and the use of complementary and alternative medicine in rural Victoria, Australia

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Abstract

Objective: The relationship between chronic pain and complementary and alternative medicine (CAM) use is poorly understood, and the situation in rural Australia is particularly unclear. The objective here was to determine the socio-demographic factors associated with the use of CAM for the treatment of chronic pain in a region of rural Australia.

Methods: This secondary analysis used data from a population health survey, Crossroads-II, to assess the relationships of various socio-demographic factors with the use of CAM by those suffering from chronic pain.

Design: Face-to-face surveys at households randomly selected from residential address lists.

Setting: A large regional centre and three nearby rural towns in northern Victoria, Australia.

Participants: Sixteen years of age and older.

Main Outcome Measures: Use of a CAM service to treat chronic pain.

Results: Being female (2.40 [1.47, 3.93], $p < 0.001$) and having a bachelor's degree (OR 2.24 [1.20, 4.20], $p < 0.001$) had a significant positive relationship with the use of CAM overall to redress chronic pain and those 50 years and older had greater odds of using manipulation therapies relative to those below 50 years (50–64: OR 0.52 [0.32, 0.86], $p = 0.010$; 65+: 0.37 [0.18, 0.75], $p = 0.005$).

Conclusion: In the studied region, females and those with university education have the greatest odds of using CAM to treat chronic pain. This study needs to be complemented with more mechanistic investigations into the reasons people make the decisions they make about using CAM for the management of chronic pain.

KEYWORDS

acupuncture therapy, chiropractic, complementary therapies, musculoskeletal manipulations, pain

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1 | INTRODUCTION

Chronic pain likely affects around one in three people worldwide.¹ While traditional medical practice is the mainstay for its management, many sufferers turn to Complementary and Alternative Medicine (CAM) in search of relief.² Estimates of the frequency of use of CAM treatments for reprieve from chronic pain in various contexts vary markedly.^{3–6} A UK study found that of the population reporting chronic pain, 18% had used a CAM therapist recently, which can be contrasted against 67% seeing a general practitioner and 34% visiting a hospital specialist.⁴ Research on veterans in the USA found that not only did 82% use CAM, but 99% indicated a willingness to try it for pain relief.³ Conversely, when primary care patients who were using CAM to remedy chronic pain were asked hypothetically which approach they would use if they had to choose between continuing with CAM or traditional therapies, 87% chose the latter.⁶ Nonetheless, 52% of that population used CAM for their chronic pain management and 54% of these believed it to be beneficial.

Recent studies found that 63% of Australians use CAM services of some form: 36% consulted CAM practitioners and 50% used CAM products, especially vitamin and mineral supplements—not necessarily complementary—and homeopathic remedies.^{7,8} Further, a systematic review revealed various push and pull factors driving CAM use in Australia.⁹

None of these studies have assessed CAM use specifically in the context of chronic pain in Australia, let alone in a solely rural context. The most recent estimate (2018) is that chronic pain annually afflicts 3.24 million Australians (15.4%), which equates to 340 384 disability-adjusted life years and a total financial cost of AU\$73.2 billion.¹⁰ Further, rural and remote Australians had higher rates of medication prescription for chronic pain, which has been suggested to reflect a greater prevalence of the condition and less access to pain management services.¹⁰ Such dynamics potentially create a niche for CAM therapies in rural areas, but to date, little is understood about this.

Here, the influence of various socio-demographic factors on the prevalence of CAM use is investigated in a rural region of northern Victoria, Australia, using data from a large population health study: Crossroads-II.

2 | METHODS

2.1 | Survey

The data are from the Crossroads-II longitudinal study of four rural towns in the Goulburn Valley in northern

What this paper adds

- In the Goulburn Valley of regional northern Victoria, people who hold a bachelor's degree and are female have greater odds of using CAM for chronic treatment than those who do not.
- There were no significant associations between other sociodemographic parameters and CAM use for chronic pain treatment.

What is already known on the subject

- CAM practitioners are used widely in Australia, with about one-third of the population using them.
- The drivers for CAM use are well understood in urban environments but have received scant attention in rural settings.

Victoria: Benalla, Cobram, Seymour and Shepparton-Mooroopna. The first three of these are classified by the Modified Monash Model as medium rural towns (MMM4) and the last is a large rural town (MMM3). Surveys were conducted in person via home visits, from October 2016 to November 2018, and details of the process can be found elsewhere.¹¹ Of those surveyed, 22% (595 of 2679) reported having suffered chronic pain at some stage. The CAM services listed on the survey were: acupuncture, aromatherapy, biofeedback treatment, chiropractic, herbal remedies, hypnotherapy, massage therapy, mind–body therapies, osteopathy, relaxation therapy, reiki, Tai Chi, therapeutic touch and yoga. Participants were also provided with the opportunity to add other treatment options, and to this end, crystal therapy, Bowen therapy, psychic-energy healing and traditional Chinese medicine completed the list of CAM therapies. The descriptor ‘Any CAM’ is used to denote the use of any of the CAM modalities. Further, CAM sub-groups were investigated by using the five domains outlined by the National Centre for Complementary and Alternative Medicine.¹²

2.2 | Analysis

Binomial generalized linear mixed modelling (GLMM) was used to test various fixed effects: age, sex, school completion, university completion, health insurance, employment status and principal language. The health insurance variable specifically relates to hospital cover, but most schemes have various CAM options in a

hospital-extras package and those with such insurance might have greater means. GLMM was used because the dependent variables were Bernoulli distributed. GLMM is a special case of generalized linear modelling (GLM), but it has the advantage here of accommodating a random effect, in this case, *town*. A logit link function with an intercept term was used to relate the expected value of the response variable to the model's linear predictors. Fisher's least significant difference ($p=0.05$) was used for post hoc pairwise comparisons among means other than the reference level.

A variance inflation factor > 10 was taken as an initial indicator of collinearity.¹³ A singular value row of the $\mathbf{\Pi}$ matrix of decomposed variances had a condition index (η) > 15 and two or more variance proportions > 0.5 were taken to indicate collinearity.¹³ Collinearity did not occur.

The cut-off probabilities were calculated by determining the Youden J statistic, $(1 - \beta) + (1 - \alpha) - 1$: the point on the receiver operating characteristic (ROC) curve where the total error is at a minimum.^{14,15} The performance of the model was gauged by determining achieved sensitivity, specificity, accuracy and area under the ROC curve, with the last being an indicator of discriminatory ability.

Age categories were based on meaningful stages: 18 (age of independence), 50 (the age when various free health checks, including breast screening and colon cancer testing, come into effect) and 65 (eligibility age for the My Aged Care service).

3 | RESULTS

The age of respondents ranged from 16 to 94 (Table 1). About 60% of the participants were female. Just over half had not completed high school and 96% spoke English at home. Almost half of the participants lived in Shepparton-Mooroopna, with roughly similar numbers being from the smaller towns (Table 1). One-third of the participants were employed either on a full-time or part-time/casual basis.

Of the people reporting chronic pain, 32% stated trying at least one CAM service to redress it. In contrast, 27% of those not afflicted by chronic pain used CAM. All the CAM options listed in the chronic pain survey were used by at least one participant.

Females had greater odds than males of using Any CAM (OR 2.40 [1.47, 3.93], $p < 0.001$) (Table 2). University graduates had greater odds of using any CAM relative to those who had not finished Year 12 (OR 2.24 [1.20, 4.20], $p < 0.001$), but there was no difference between Year-12 completers and non-completers ($p = 0.241$). Further, there was a significant difference ($p = 0.005$) between university students relative to Year-12 completers. All other independent variables were insignificant predictors ($p > 0.05$).

Owing to small sample sizes, models failed to converge for CAM modalities individually as well as for all domains save manipulation therapies. Those in the age groups 50–64 and 65+ had significantly lower odds of using manipulation therapies than those 16–49 years of age (50–64: OR 0.52 [0.32, 0.86], $p = 0.010$; 65+: 0.37 [0.18,

TABLE 1 Demographic characteristics of participants who reported chronic pain.

Population	Users of CAM	Non-users of CAM
Age	Mean: 56.3 (range: 17–93)	61.2 (16–94)
Sex	Female: 116 (63%)	245 (60%)
	Male: 72 (38%)	162 (40%)
Education (highest)	Not finished Yr 12: 85 (47%)	215 (56%)
	Yr 12: 61 (34%)	132 (34%)
	University: 34 (19%)	38 (10%)
Language at home	English: 174 (96%)	354 (95%)
	Other: 7 (4%)	17 (5%)
Town	Benalla: 38 (20%)	61 (15%)
	Cobram: 23 (12%)	68 (17%)
	Seymour: 26 (14%)	83 (20%)
	Shepparton-Mooroopna: 101 (54%)	195 (48%)
Employment	Full-time: 56 (31%)	45 (12%)
	Part-time/casual: 36 (20%)	45 (12%)
	Unemployed: 50 (28%)	167 (45%)
	Retired: 6 (3%)	24 (6%)
	Other: 32 (17%)	90 (24%)

TABLE 2 Independent variables in the fixed-effects component of the GLMM model and relationships with the use of CAM. The reference category is denoted in parentheses. *b* = partial regression coefficient. Odds ratios are adjusted.

Variable	Any CAM			Manipulation therapies		
	<i>b</i>	OR [CI ₉₅]	<i>p</i>	<i>b</i>	OR [CI ₉₅]	<i>p</i>
Age (16–49)	—	—	0.105	—	—	0.008
50–64	–0.09	0.92 [0.54, 1.56]	0.749	–0.65	0.52 [0.32, 0.86]	0.010
65+	–0.81	0.45 [0.19, 1.02]	0.055	–1.00	0.37 [0.18, 0.75]	0.005
Sex (male)	—	—	—	—	—	—
Female	0.88	2.40 [1.47, 3.93]	<0.001	–0.24	1.28 [0.84, 1.93]	0.248
Education (<year 12)	—	—	0.018	—	—	0.425
Year 12	–0.31	0.74 [0.44, 1.23]	0.241	–0.04	0.96 [0.62, 1.49]	0.846
University	0.81	2.24 [1.20, 4.20]	0.012	0.36	1.43 [0.79, 2.60]	0.237
Private insurance (no)	—	—	—	—	—	—
Yes	0.13	1.14 [0.70, 1.85]	0.599	0.29	1.34 [0.88, 2.04]	0.177
Employment (FT)	—	—	0.841	—	—	0.021
Part-time/casual	–0.13	0.88 [0.04, 1.85]	0.739	0.13	1.14 [0.59, 2.19]	0.705
Retired	–0.38	0.68 [0.29, 1.62]	0.383	–0.50	0.61 [0.29, 1.28]	0.188
Unemployed	0.31	1.36 [0.53, 3.50]	0.528	–0.37	0.69 [0.28, 1.70]	0.417
Other	–0.70	0.93 [0.48, 1.81]	0.837	–0.83	0.44 [0.24, 0.81]	0.008
English at home (no)	—	—	—	—	—	—
Yes	0.19	1.21 [0.31, 4.78]	0.789	–0.21	0.81 [0.27, 0.24]	0.713
Intercept	–2.51	0.08 [0.02, 0.31]	<0.001	–0.47	0.62 [0.21, 1.89]	0.402

0.75], $p=0.005$), but there was no significant difference between the last two categories ($p=0.275$). Persons in the ‘other’ employment category had lower odds of using manipulation therapies than those employed full-time (OR 0.44 [0.24, 0.81], $p=0.008$), but there were no other significant pairwise comparisons between levels ($p>0.05$). Significant differences were not observed for the other independent variables.

The random effect of *town* dropped out of both models as functionally redundant parameters. The Any CAM model discriminated well with the determined cut-off probability of 0.257, as indicated by an accuracy of 67.50% and an AUC of 0.713 (CI₉₅ [0.662, 0.764], $p<0.001$ for H_0 that AUC=0.5). The specificity was 68.83% [64.81, 72.85] and the sensitivity was 63.11% [59.10, 67.13], implying that the model was marginally better at correctly classifying no use of CAM than it was at correctly classifying true use of CAM. Likewise, for the manipulation therapies model (cut-off=0.419): AUC=0.679 ([0.629, 0.728], $p<0.001$); accuracy=67.50% [63.48, 71.50]; specificity=81.27 [77.33, 85.21]; sensitivity=47.16 [43.22, 51.10], again suggesting better performance at correctly predicting true non-use of CAM.

Manipulation therapies were the most-used domain of CAM with massage and chiropractic accounting for the overwhelming majority of use in this domain (Table 3).

4 | DISCUSSION

The only two significant relationships with CAM use holding a bachelor's degree and being female. Level of educational attainment, broadly, has been reported to positively coincide with greater use of CAM by chronic pain sufferers.^{5,6} Conversely, Koloski et al.¹⁶ found no difference in education level in terms of the use of CAM by people seeking pain relief from irritable bowel syndrome. Tan et al.¹⁷ observed likewise for CAM and chronic pain in general. The effect of education might be confounded with wealth, for income has been demonstrated to be positively related to CAM adoption by chronic pain sufferers, yet other investigations have found either no relationship or varying income effects across different CAM modalities.^{17–19} A limitation of the present study was the lack of a direct measure of wealth or income.

Most studies on chronic pain and the use of CAM have not found a difference in use between the sexes.^{3,5,6,17,20} A large Australian study found that young and middle-aged women use a massage therapist more frequently if they suffered musculoskeletal problems than those who did not.²¹ The research also revealed significantly lower use of massage therapy by young women in rural/remote areas, but no rurality association was observed for middle-aged women. A study in the Grampian region of Scotland of sufferers of chronic pain claimed that women sought

TABLE 3 Frequency of use of different CAM modalities, organized by domains.

Domain	CAM modality	Persons using	%
Biologically based therapies		46	8.3
	Herbal	46	8.3
Energy therapies		40	7.2
	Aromatherapy	26	4.7
	Aura and crystal therapy	1	0.2
	Psychic energy	1	0.2
	Reiki	12	2.2
Mind-body therapies		112	20.1
	Biofeedback	1	0.2
	Hypnotherapy	12	2.2
	Mind-body therapy	23	4.1
	Relaxation therapy	51	9.2
	Yoga	25	4.5
Manipulation therapies		261	46.9
	Bowen	2	0.4
	Chiropractic	106	19.0
	Massage	140	25.1
	Osteopathy	13	2.3
Whole medical systems		98	17.6
	Acupuncture	83	14.9
	Tai Chi	13	2.3
	Traditional Chinese medicine	2	0.4

CAM for relief more frequently than did men.⁴ Similarly, for irritable bowel syndrome, having accounted for the sex differences in the frequency of the condition, Koloski et al.¹⁶ found that women have far greater odds (OR 4.36) of seeking relief from CAM. They also reported the absence of a sex difference in frequency of use of conventional health care.

Haetzman et al. claimed that younger participants in chronic pain used alternative therapy more than older individuals, but in fact, they produced a significant effect of age without testing probabilistically for differences among levels, and their youngest age category, 29–38 years, comprised a sample size of 12 individuals and their oldest, 79+, comprised just 4 individuals.⁴ No age effect was found in another chronic pain study of CAM use.¹⁷ While we did not detect an age effect for Any CAM, the odds of using manipulation therapies were greater for those under 50 years of age.

CAM treatments are used broadly across society either alongside or in place of conventional health care. Very little is known of their specific use in the context of chronic pain and the distinction between rural/remote and urban regions has received scant attention in this context in Australia and elsewhere. Here, it was demonstrated that those with the greatest odds of using CAM

held a bachelor's degree and were female. The descriptive approach taken here needs to be complemented with mechanistic studies, qualitative and quantitative, to aid our understanding of why such differences exist.

AUTHOR CONTRIBUTIONS

Andrew J. Hamilton: Formal analysis; data curation; writing – original draft. **Lisa Bourke:** Conceptualization; funding acquisition; writing – review and editing. **Geetha Ranmuthugala:** Writing – review and editing; formal analysis. **Kristen Glenister:** Data curation; methodology. **David Simmons:** Methodology; conceptualization; funding acquisition; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.


ETHICS STATEMENT

Ethics approval was granted by the Goulburn Valley Health Ethics Committee (GVH 20/16) in May 2016. Informed written consent was obtained from each household survey participant aged 16 years or older.

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