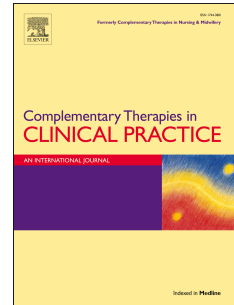


Accepted Manuscript

Health literacy screening of patients attending a student-led osteopathy clinic: A pilot investigation

Brett Vaughan, Jane Mulcahy, Kylie Fitzgerald



PII: S1744-3881(16)30035-4

DOI: [10.1016/j.ctcp.2016.05.004](https://doi.org/10.1016/j.ctcp.2016.05.004)

Reference: CTCP 651

To appear in: *Complementary Therapies in Clinical Practice*

Received Date: 27 April 2016

Accepted Date: 6 May 2016

Please cite this article as: Vaughan B, Mulcahy J, Fitzgerald K, Health literacy screening of patients attending a student-led osteopathy clinic: A pilot investigation, *Complementary Therapies in Clinical Practice* (2016), doi: 10.1016/j.ctcp.2016.05.004.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Health literacy screening of patients attending a student-led osteopathy clinic: a pilot investigation.

Brett Vaughan MHIthSc^{a,b}
Jane Mulcahy PhD^a
Kylie Fitzgerald MHIthSc^a

^a College of Health & Biomedicine, Victoria University, Melbourne, Australia

^b Institute for Sport, Exercise and Active Living, Victoria University, Melbourne, Australia

Address correspondence to:

Brett Vaughan
College of Health & Biomedicine
Flinders Lane Campus
Victoria University
PO Box 14428
Melbourne VIC 8001

Phone: +61 3 9919 1210

Fax: +61 3 9919 1030

E-mail: brett.vaughan@vu.edu.au

Funding

No funding was received to conduct the study.

**Health literacy screening of patients attending a student-led osteopathy clinic: a pilot
investigation**

ACCEPTED MANUSCRIPT

ABSTRACT

Adequate levels of health literacy (HL) are required for patients to access appropriate health services and develop an understanding of the options for managing their healthcare needs. There is limited literature on HL of patients seeking care for a musculoskeletal complaint. The present study sought to screen the HL of patients presenting to an Australian osteopathy student-led clinic using a single screening question 'Are you confident completing medical forms?'. Less than 10% of patients attending the clinic were considered to have below adequate levels of HL using this question, consistent with other work in Australian populations. Logistic regression analysis identified that the most significant demographic variables associated with lower HL were patients who did not speak English at home, those with lower education levels, and those who were less satisfied with their life. Evaluation of a patients' HL may assist practitioners to improve patient education and management strategies.

1. INTRODUCTION

Health literacy may be defined as the knowledge and skills required to understand and use information relating to health issues.¹ Adequate health literacy has been found to better inform a person's decisions on seeking and obtaining appropriate health care.² Low health literacy has been associated with a range of adverse health outcomes. These include increased hospitalisation rates, increased use of emergency care facilities, inappropriate medication usage, increased risk of adverse outcome, low compliance with Australian health screening programs and limited ability to interpret public health messages.^{3,4} Level of education (high school or less), non-English speaking background and older age have been shown to be related to low levels of health literacy.⁵ Estimates of self-reported health literacy in the Australian population have found that 59% have a below adequate level.¹ This data suggests low health literacy is a public health concern in Australia for patients, health practitioners and the health system.

Australian osteopaths are primary contact health professionals who predominantly manage patients with musculoskeletal complaints using a variety of interventions including manual therapy, exercise rehabilitation and health advice. The majority of people seeking care from an osteopath in Australia are self-referred on recommendation from family/friends, from advertising, or by referral from another health professional.⁶⁻⁸ A referral from a medical practitioner is not required to visit an osteopath in Australia, and a small number of patients would be referred to an osteopath by a medical professional.⁸ Given the primary contact nature of osteopathy practice, and previous research suggesting health literacy is related to outcomes for musculoskeletal disorders,^{2,9-11} it is important to explore levels of health literacy of patients seeking osteopathy treatment. The present study sought to evaluate demographic

influences on self-reported health literacy in patients attending an Australian student-led osteopathy clinic.

2. METHOD

The study was approved by the Victoria University (VU) Human Research Ethics Committee. All new patients 18 years of age or over attending the VU Osteopathy Clinic (a university teaching clinic) during the period April-October 2015 were invited to complete a health information form prior to their consultation. This form asked about a variety of health-related information relevant to health literacy and Australian population health.¹² Health literacy was evaluated using a single item 'How confident are you completing medical forms?' with a response scale 'Extremely confident' to 'Not at all confident'. This item has previously been demonstrated to be an appropriate screen of health literacy in United States health consumers.^{13, 14} Demographic data were also extracted from the patient details form completed prior to the consultation.

Data were entered into SPSS (version 21) then exported to R ¹⁵ for analysis. Descriptive statistics were generated using the *psych* package¹⁶ in R . Ordinal logistic regression was used to evaluate the relationship between the health literacy item as the dependent variable, the other health information and demographic variables. Backward stepwise regression using the Akaike information criterion (AIC) as the cutoff was used to develop the model. This was performed using the *rms* package¹⁷ in R . Coefficients for factors in the final model were converted to odds ratios and interpreted as per Hopkins.¹⁸

3. RESULTS

Data from 508 patients were available for the analysis representing a 70.0% response rate. Mean age was 22.62 years (± 13.84 years). Demographic variables are presented in Table 1 and the health literacy screening question “Are you confident completing medical forms?” is presented in Figure 1.

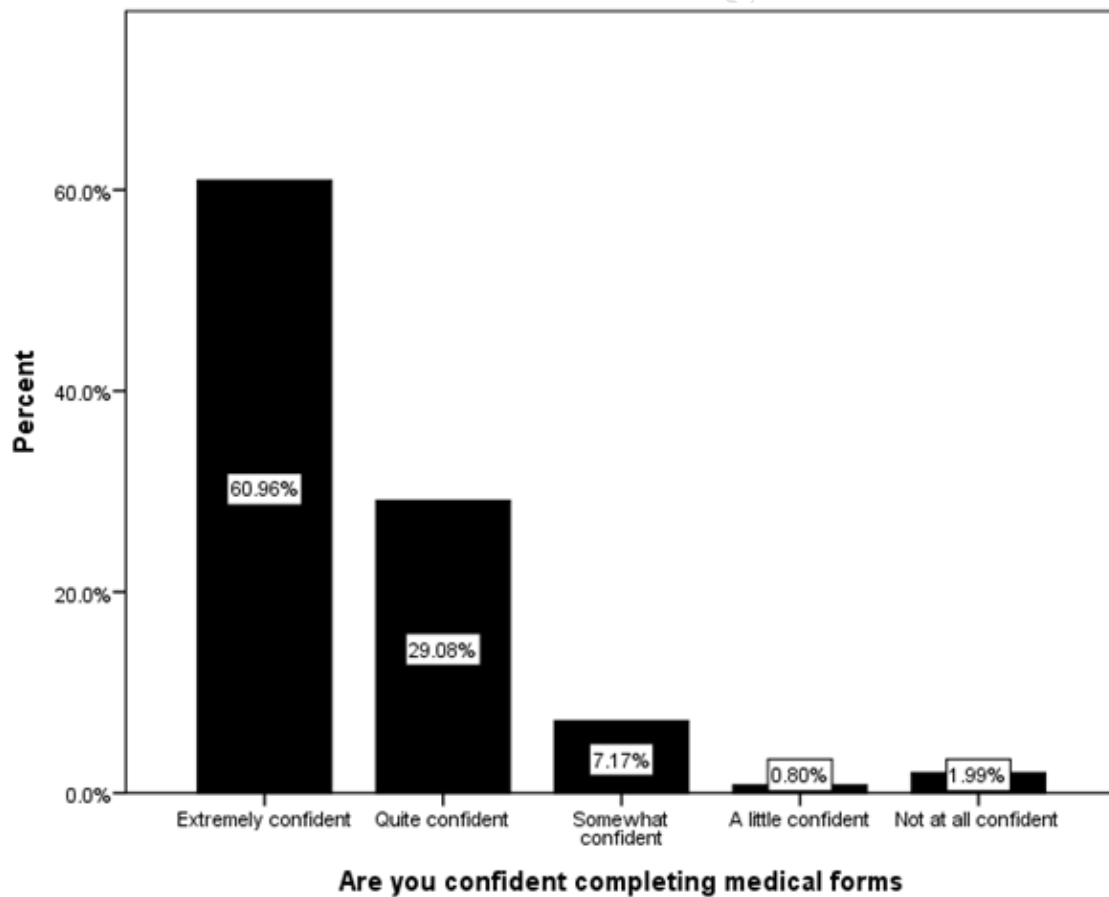
Table 1. Demographic variables.

Gender	
Male	205 (40.4%)
Female	302 (59.4%)
Born in Australia	
Yes	329 (64.8%)
No	176 (34.6%)
Speak English at Home	
Yes	462 (90.9%)
No	46 (9.1%)
Live alone	
Yes	55 (10.8%)
No	432 (85.0%)
Private health insurance	
Yes	249 (49.0%)
No	252 (49.6%)
Smoking	
Yes	67 (13.2%)
No	420 (82.7%)
Highest level of education attended	
Primary	6 (1.2%)
High school (not complete)	34 (6.7%)
High school (complete)	59 (11.6%)
TAFE/Trade	83 (16.3%)
University	321 (63.2%)
Hours of sleep per night (median)	7-8 hours
Serves of fruit each day (median)	2 (range 0-6 serves)
Serves of vegetables each day (median)	3 (range 0-7 serves)
Exercise per day (median)	30-60 minutes
Blood pressure checked in last 6 months	
Yes	310 (61%)
No	197 (38.8%)
Skin cancer check in last 6 months	

Yes	66 (13%)
No	440 (86.6%)
Healthcare card	
Yes	206 (40.6%)
No	292 (57.5%)
General health (median)	
	3 (range 1-5)
Satisfaction with life (median)	
	4 (range 1-5)
Clinic	
Melbourne city	426 (83.9%)
St Albans	81 (15.9%)

Note: percentages that do not add to 100% represent missing data.

Figure 1. Health literacy screening question responses.



Logistic regression analysis identified a number of relationships between self-reported health literacy and the demographic variables (Table 2). The odds ratios for each demographic variable and its relationship with self-reported health literacy were *small*.

Table 2. Logistic regression analysis.

Demographic variable	Coefficient*	p-value	Odds ratio	95%CI
Speak English at home (yes/no)	1.03	<0.001	2.66 (small)	1.17-5.05
Private health insurance (yes/no)	0.51	0.02	1.66 (small)	1.08-2.50
Smoking (yes/no)	-0.52	0.02	1.68 (small)	1.12-2.85
Education level	-0.42	<0.001	1.52 (small)	1.25-1.87
Fruit intake per day	0.21	0.079	1.23 (small)	1.01-1.55
Vegetable intake per day	-0.14	0.063	1.15 (small)	1.03-1.35
Satisfaction with life	-0.43	<0.001	1.53 (small)	1.12-1.97
Clinic attended	-0.64	0.005	1.89 (small)	1.05-3.56

* higher health literacy is represented by a 1 or 2 on the screening question

4. CONCLUSION

Slightly less than 10% of the new patients presenting to an Australian student-led osteopathy clinic self-reported being *somewhat confident* or less completing medical forms. This level was taken as having below adequate levels of health literacy and is relatively consistent with reported health data in a Victorian population.¹⁹ The population of patients attending the student-led osteopathy clinic appears to demonstrate a higher level of health literacy compared to data from the general Australian population. Australian Bureau of Statistics data shows approximately 59% of the Australian population were below the minimum level for health literacy), and Adams et al.²⁰ reported approximately 45% of their Australian study population had limited health literacy. Whilst the present study used a single item question and was therefore different to that in the aforementioned studies, the patient population in the student-led osteopathy clinic appears to have significantly higher health literacy than the Australian population. The "...low visibility [of osteopathy compared] with other health professionals..."⁸ suggests that patients with higher levels of health literacy may be more likely to access osteopathy services. That is, they have an understanding of how an osteopath may be able to assist with their health complaint.

Not speaking English at home was the greatest predictor of health literacy in this patient population (odds ratio = 2.66, *small*). This is consistent with Australian Bureau of Statistics¹ data and work by Beauchamp²¹ in a Victorian chronic pain population. The latter authors demonstrated that Health Literacy Questionnaire factor scores were lower for those who did not speak English at home, with small to large effect sizes. This result suggests practitioners need to be mindful of a patient's English language skills when explaining the management plan and obtaining consent.²²

Fruit and vegetable intake was also associated with self-reported health literacy. Patients who had higher vegetable intake reported higher health literacy scores and this relationship has been identified in previous research.²³ The converse was observed for fruit intake however. The lack of consistent results for self-reporting fruit/vegetable consumption potentially highlights an issue where patients report expected rather than real intake.²⁴ The odds ratios reported in the present study are the smallest of the significant coefficients suggesting that fruit and vegetable intake has a small relationship with health literacy in patient's seeking osteopathy care in a student-led clinic.

The present study is one of the first to investigate the relationship between self-reported health literacy and satisfaction with life. A positive association was observed between these two variables albeit the odds ratio was *small* (odds ratio 1.53). Other studies have demonstrated associations between life satisfaction and self-reported general health,²⁵ and the small odds ratio observed in the present study requires further investigation with other tools used to evaluate health literacy.²⁶ Previous Australian research has identified that self-reported general health status was associated with lower levels of health literacy.¹ This was not observed in the current study and may, in part, be accounted for by the lower mean age of patients attending the clinics. The median for this item was in the middle of the 1-5 Likert-type scale. Barber, Staples¹⁹ also demonstrated associations between age, gender and health literacy. Females and younger persons were reported to demonstrate higher health literacy, however this was not observed in the present study.

Possessing private health insurance was associated with higher levels of health literacy (odds ratio 1.66, *small*). Beauchamp²¹ demonstrated that those patients with health insurance had higher scores on the Health Literacy Questionnaire '*Actively managing my health*' and '*Social support for health*' factors although the effect sizes were small. Although patients are not able to use their private health

insurance to obtain a rebate on their osteopathy treatment in the VU Osteopathy Clinic, possessing this insurance suggests some understanding of the health system and the range of services that can be accessed beyond that provided in the public health system. Education level was also associated with self-reported health literacy. Higher levels of education participation and attainment were associated with increased health literacy in the present study and this is consistent with the current literature.^{1, 19, 22}

Generalisability of the results to other populations, including those presenting to private Australian osteopathy practices is limited. The results of the present study are somewhat consistent with the literature on health literacy, and provide some evidence for the validity of the single item health literacy screening question that was utilised. Further work is required to validate the question in this population in addition to exploring the relationship between health literacy, reasons for attending the clinic, and osteopathy treatment outcome. There are a substantial number of tools available to measure health literacy²⁶ however single item screening questions such as that used in this study may provide clinicians with a simple way of identifying those patients with limited health literacy, in turn, informing clinicians of how best to manage a patient.

This pilot investigation identified that a small number of patients attending the VU Osteopathy Clinic may have limited health literacy. Further, the study also identified demographic factors that could assist in the identification of patients with limited health literacy. The impact of this limited health literacy on decision making and informed consent,²² and patient management warrants further investigation. These findings also reinforce the need for health professions curricula to incorporate an understanding of the impact of low health literacy in order to improve patient care²² and treatment outcomes.

REFERENCES

1. Australian Bureau of Statistics. Health literacy, Australia. 2006 (No 4233.0). Canberra: Commonwealth of Australia, 2008.
2. Rosenbaum AJ, Phillips N, Patel N, Uhl R, Mulligan M, Pauze D, et al. Assessment of orthopaedic literacy in an urban emergency department: pilot results of the literacy in musculoskeletal problems (LiMP) project. *Current Orthopaedic Practice*. 2013;24(4):400-5.
3. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low health literacy and health outcomes: an updated systematic review. *Annals of Internal Medicine*. 2011;155(2):97-107.
4. DeWalt DA, Berkman ND, Sheridan S, Lohr KN, Pignone MP. Literacy and health outcomes. *Journal of General Internal Medicine*. 2004;19(12):1228-39.
5. Paasche-Orlow MK, Parker RM, Gazmararian JA, Nielsen-Bohman LT, Rudd RR. The prevalence of limited health literacy. *JGIM: Journal of General Internal Medicine*. 2005;20(2):175-84.
6. Orrock PJ. Profile of members of the Australian Osteopathic Association: Part 2–The patients. *International Journal of Osteopathic Medicine*. 2009;12(4):128-39.
7. Burke SR, Myers R, Zhang AL. A profile of osteopathic practice in Australia 2010–2011: a cross sectional survey. *BMC Musculoskeletal Disorders*. 2013;14(1):1-10.
8. Burke SR, Myers R, Zhang AL. A profile of osteopathic practice in Australia 2010–2011: a cross sectional survey. *BMC Musculoskeletal Disorders*. 2013;14(1):227.
9. Rosenbaum AJ, Pauze D, Pauze D, Robak N, Zade R, Mulligan M, et al. Health Literacy in Patients Seeking Orthopaedic Care: Results of the Literacy in Musculoskeletal Problems (LiMP) Project. *The Iowa orthopaedic journal*. 2015;35:187.
10. Rosenbaum AJ, Tartaglione J, Abousayed M, Uhl RL, Mulligan MT, Alley M, et al. Musculoskeletal Health Literacy in Patients With Foot and Ankle Injuries A Cross-Sectional Survey of Comprehension. *Foot & Ankle Specialist*. 2015:1938640015593078.

11. Caplan L, Wolfe F, Michaud K, Quinzanos I, Hirsh JM. Strong Association of Health Literacy With Functional Status Among Rheumatoid Arthritis Patients: A Cross-Sectional Study. *Arthritis care & research*. 2014;66(4):508-14.
12. Osborne RH, Batterham RW, Elsworth GR, Hawkins M, Buchbinder R. The grounded psychometric development and initial validation of the Health Literacy Questionnaire (HLQ). *BMC Public Health*. 2013;13(1):658.
13. Chew LD, Griffin JM, Partin MR, Noorbaloochi S, Grill JP, Snyder A, et al. Validation of Screening Questions for Limited Health Literacy in a Large VA Outpatient Population. *Journal of General Internal Medicine*. 2008;23(5):561-6.
14. Chew L, Bradley K, Boyko EJ. Brief questions to identify patients with inadequate health literacy. *Family Medicine*. 2004;36(8):588-94.
15. R Core Team. R: A language and environment for statistical computing Vienna, Austria 2015. Available from: www.R-project.org/.
16. Revelle W. *psych*; Procedures for Personality and Psychological Research Evanston, Illinois, USA: Northwestern University; 2015. 1.5.4:[Available from: <http://CRAN.R-project.org/package=psych>.
17. Harrell FJ. *rms: Regression Modeling Strategies* 2015 [cited 2015 15 December]. 4.4-0:[Available from: <https://cran.r-project.org/web/packages/rms/index.html>].
18. Hopkins WG. A new view of statistics. : Internet Society for Sport Science; 2000 [cited 2013 6 February]. Available from: <http://www.sportsci.org/resource/stats/effectmag.html>.
19. Barber MN, Staples M, Osborne RH, Clerehan R, Elder C, Buchbinder R. Up to a quarter of the Australian population may have suboptimal health literacy depending upon the measurement tool: results from a population-based survey. *Health Promotion International*. 2009;24(3):252-61.
20. Adams RJ, Piantadosi C, Ettridge K, Miller C, Wilson C, Tucker G, et al. Functional health literacy mediates the relationship between socio-economic status, perceptions and lifestyle behaviors related to cancer risk in an Australian population. *Patient education and counseling*. 2013;91(2):206-12.

21. Beauchamp A, Buchbinder R, Dodson S, Batterham RW, Elsworth GR, McPhee C, et al. Distribution of health literacy strengths and weaknesses across socio-demographic groups: a cross-sectional survey using the Health Literacy Questionnaire (HLQ). *BMC Public Health*. 2015;15(1):1.
22. Australian Commission on Safety and Quality in Health Care. *Health literacy: Taking action to improve safety and quality*. Sydney, Australia: 2014.
23. Silk KJ, Sherry J, Winn B, Keesecker N, Horodyski MA, Sayir A. Increasing nutrition literacy: Testing the effectiveness of print, web site, and game modalities. *Journal of Nutrition Education and Behavior*. 2008;40(1):3-10.
24. Westerterp KR, Goris AH. Validity of the assessment of dietary intake: problems of misreporting. *Current Opinion in Clinical Nutrition & Metabolic Care*. 2002;5(5):489-93.
25. Strine TW, Chapman DP, Balluz LS, Moriarty DG, Mokdad AH. The associations between life satisfaction and health-related quality of life, chronic illness, and health behaviors among US community-dwelling adults. *Journal of community health*. 2008;33(1):40-50.
26. Haun JN, Valerio MA, McCormack LA, Sørensen K, Paasche-Orlow MK. Health literacy measurement: an inventory and descriptive summary of 51 instruments. *Journal of health communication*. 2014;19(sup2):302-33.

CONFLICT OF INTEREST

The authors report no conflict of interest in relation to the manuscript.

ACCEPTED MANUSCRIPT

Brett Vaughan is a lecturer in the College of Health & Biomedicine, Victoria University, Melbourne, Australia and a Professional Fellow in the School of Health & Human Sciences at Southern Cross University, Lismore, New South Wales, Australia. His interests are competency and fitness-to-practice assessments and evaluation, clinical education in allied health, and musculoskeletal rehabilitation.

Jane Mulcahy is a lecturer in the College of Health & Biomedicine at Victoria University, Melbourne, Australia. Her interests include scale development, health psychology, chronic illness and population health.

Kylie is a lecturer in the College of Health & Biomedicine at Victoria University, Melbourne, Australia. Kylie graduated from the osteopathy course at VU in 2002. She is passionate about osteopathic education and has a strong interest in clinical osteopathic research and providing stimulating learning environments and opportunities for osteopathic students.