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# New Zealand Osteopaths and the Management of Older Adults: Outcomes from a Practice-Based Research Network

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## Abstract

Older adults represent a growing proportion of healthcare consumers, and yet little is known about the osteopathic practitioners who regularly manage this population. This study set out to understand what characteristics are common among New Zealand osteopaths who regularly treat older adults. This cross-sectional, exploratory study was a secondary analysis of questionnaire data collected through a practice-based research network. The questionnaire captured osteopaths' demographic characteristics, practice settings, and clinical management approaches. Of the 277 osteopaths who completed the questionnaire, 188 (67.9%) reported frequently treating older adults. Those most likely to do so were based in urban areas, treated wrist and degenerative spinal complaints, and used exercise prescription as part of their practice. These findings suggest that a substantial number of New Zealand osteopaths are actively involved in the care of older adults, highlighting the need for further research into the role osteopathy can play in supporting this growing patient population.

**Keywords:** allied health personnel; health workforce; manual therapy; musculoskeletal manipulations



Academic Editor: Yunhwan Lee

Received: 21 May 2026

Revised: 9 July 2026

Accepted: 22 July 2026

Published: 23 July 2026

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## 1. Introduction

Every nation's population is experiencing growth in both the magnitude and percentage of older people. Challenges associated with an ageing population extend far beyond demographic statistics, requiring knowledge of the intricacies of healthcare delivery and the management of age-related health complaints. Common conditions in older people include musculoskeletal complaints such as back and neck pain, osteoarthritis, and sarcopenia, alongside other conditions such as hearing loss, cataracts, chronic obstructive pulmonary disease, diabetes, depression, dementia, loneliness, and social isolation [1–3]. The pathological loss of muscle mass, strength, and physical performance that occurs with ageing and

its associated loss of physical independence and heightened risk of falls further compound a nexus of health concerns that demand comprehensive and tailored interventions [4].

With ageing, people are more prone to experience several conditions simultaneously [5]. According to Statistics New Zealand [6], those aged 65 years and older are projected to represent one-quarter of the total population by 2050, and the need for health facilities to manage musculoskeletal and other health conditions will likely increase substantially. In the Osteopathic International Alliance/World Health Organization collaborative project profiling the osteopathic profession in 2020 [7], approximately 15% of patients consulted by osteopaths were over the age of 65 years. In the United Kingdom, Plunkett et al. reported that 25.3% of osteopathic patients were over 65 years of age, suggesting that osteopaths are playing a role in the care of older adults [8].

Osteopaths may contribute to the conservative management of musculoskeletal conditions in older adults through manual therapy, exercise-based advice, and, where appropriate, referrals [3,9]. Exercise interventions can reduce the risk of falling and support physical function in older adults [10], assist in coping with the fear of falling [11], and encourage a healthier lifestyle focused on nutrition, sleep, and physical activity habits. While lifestyle education, including exercise promotion, nutritional guidance, and sleep hygiene, is a shared competency across several allied health professions, such including as physiotherapists and exercise physiologists, osteopaths may offer a distinctive contribution through their integration of manual assessment and treatment with patient-centred lifestyle guidance within a single consultation [12]. Where specific dietary or sleep-related concerns are identified, referral to appropriately qualified practitioners may be warranted. However, the effectiveness of specific osteopathic approaches for fall prevention, fear of falling, and broader lifestyle outcomes requires further investigation. Little is known about the specific characteristics of osteopaths providing care to older adults in New Zealand and their clinical techniques and associated care measures. The objective of this study is to examine the characteristics of the New Zealand osteopaths involved in the management of the older adult population.

## 2. Materials and Methods

This study is a secondary analysis of data from a cross-sectional, exploratory survey sourced from a practice-based research network (PBRN) dedicated to the osteopathic profession in New Zealand. The primary aim of this study is to identify the demographic, practice, and clinical management characteristics associated with New Zealand osteopaths who frequently treat older adult patients. Ethical approval for this study was obtained from the Human Research Ethics Committee at the University of Technology Sydney (Sydney, Australia), and informed consent was provided by all participating osteopaths to complete the questionnaire.

### 2.1. Participants

Participants were selected from the New Zealand osteopathy PBRN, specifically the Osteopathy Research Connect—New Zealand (ORC-NZ) PBRN established in 2018 [13]. The recruitment of participants took place between August and December 2018, targeting registered osteopaths in New Zealand. A total of 277 osteopaths completed the ORC-NZ questionnaire, and 253 of these agreed to join the PBRN, resulting in a response rate of 48.7% within the profession [13].

### 2.2. Questionnaire

The questionnaire utilised in this study included items designed for baseline data collection as part of the PBRN. Participants were tasked with providing information about

various aspects related to themselves as practitioners, their practices, and clinical management. In terms of practitioner details, participants disclosed information such as age, gender, qualifications, and years of experience in their practice. Regarding practice details, participants reported the number of hours dedicated to patient care, the average number of patients seen weekly, the presence of other healthcare professionals at their workplace, and referrals to or from other healthcare professionals. The questionnaire also delved into patient management, with participants indicating the frequency of treating different body regions, the use of specific techniques and adjunctive therapies, and their approach to managing specific patient groups. It should be noted that the ORC-NZ questionnaire has not undergone formal psychometric validation or reliability testing.

### 2.3. Outcome Variable and Exposure Variables

The primary outcome was the self-reported frequency of treating older adult patients. Participants rated this frequency on a four-point scale: never, rarely, sometimes, and often. For logistic regression, responses were dichotomised as 'often' versus 'less often' (never, rarely, or sometimes). This approach enabled the modelling of characteristics associated with the frequent management of older adults and was consistent with previous osteopathic practice-based research network analyses [12]. Exposure variables in this study encompassed demographic and practice characteristics, collected using frequency data, binary (yes/no) responses, or continuous data.

### 2.4. Statistical Analysis

Inferential statistics were employed to investigate the relationships between individual practice characteristics and the frequency of managing older adult patients. Missing data were assessed prior to analysis. Participants with incomplete responses to the outcome variable were excluded; the extent of missing data was minimal and is unlikely to have materially affected the results. Continuous variables were compared using independent-samples *t*-tests, and categorical variables were compared using Chi-square tests with continuity correction or Fisher's exact tests where the expected cell counts were small. Variables with a significance level of  $p < 0.20$  were selected and subsequently included in a multivariate logistic regression model to ensure relevant variables were captured in the modelling that otherwise would be excluded with a narrower *p*-value [14]. Backward elimination was utilised to identify the primary predictors of osteopaths who *often* manage older patients. Backward elimination was selected given the exploratory nature of the study and the relatively large number of candidate variables identified in the univariate screening stage. This approach allows the data to inform the final model whilst retaining variables that contribute meaningfully to predicting the outcome. Adjusted odds ratios (ORa) with 95% confidence intervals (CIs) and *p*-values were calculated from this regression modelling. Statistical significance was set at  $p < 0.05$ , and JASP (version 0.18) was used for inferential statistical analyses, while SPSS (version 27) was employed for regression modelling.

## 3. Results

Of the 277 respondents, 188 (67.9%) indicated that they *often* treated older patients. New Zealand osteopaths who reported often treating older patients were more likely to identify as male and have been in clinical practice for longer than those who indicated *not often* treating older patients (Table 1).

New Zealand osteopaths who report *often* treating older patients were more likely to report receiving referrals from a range of practitioners, including general practitioners (OR 3.83), psychologists (OR 2.77) and podiatrists (OR 2.71), than their counterparts who do *not often* treat older adults (Table 2). New Zealand osteopaths who reported often treating

older patients were more likely to refer for diagnostic imaging compared with osteopaths who do not often treat older patients (OR 2.29).

**Table 1.** Demographic characteristics for New Zealand osteopaths who report *often* treating older patients compared to *not often* treating older patients.

|                                   | Often (n = 188) | Not Often (n = 89) | p-Value |
|-----------------------------------|-----------------|--------------------|---------|
| Gender                            |                 |                    |         |
| Male                              | 102 (54.2%)     | 28 (31.4%)         | <0.01   |
| Female                            | 85 (45.2%)      | 61 (68.5%)         |         |
| Other                             | 1 (0.5%)        | 0                  |         |
| Age (years)                       |                 |                    |         |
| Mean (±SD)                        | 46.8 (±11.6)    | 42.4 (±12.2)       | <0.01 ^ |
| Years in clinical practice        |                 |                    |         |
| Mean (±SD)                        | 16.4 (±10.1)    | 12.5 (±10.8)       | <0.01 * |
| Patient care hours per week       |                 |                    |         |
| Mean (±SD)                        | 28.1 (±10.7)    | 26.1 (±11.6)       | 0.17    |
| Patient visits per week           |                 |                    |         |
| Mean (±SD)                        | 32.8 (±23.3)    | 21.8 (±20.3)       | 0.74    |
| Qualification (n, %)              |                 |                    |         |
| Diploma                           | 29 (15.8%)      | 14 (15.7%)         | 0.10    |
| Advanced Diploma                  | 2 (1.1%)        | 1 (1.2%)           |         |
| Bachelor's degree                 | 58 (31.7%)      | 15 (16.8%)         |         |
| Master's degree                   | 75 (41.0%)      | 53 (59.5%)         |         |
| PhD                               | 1 (0.5%)        | 0                  |         |
| Other                             | 18 (9.7%)       | 6 (6.7%)           |         |
| Involved in, as an osteopath      |                 |                    |         |
| Clinical supervision (students)   | 20 (10.6%)      | 4 (4.5%)           | 0.14    |
| Clinical supervision (associates) | 33 (17.5%)      | 9 (10.1%)          | 0.15    |
| Volunteer                         | 33 (17.5%)      | 17 (19.1%)         | 0.88    |
| Research                          | 14 (7.4%)       | 7 (7.8%)           | 1.00    |

^ d = 0.37 (95%CI [0.12–0.63]); \* d = 0.38 (95%CI [0.12–0.64]).

**Table 2.** Practice characteristics of New Zealand osteopaths who report *often* treating older patients compared to osteopaths who do *not often* treat older patients.

|                                                    | Often (n = 188) | Not Often (n = 89) | p-Value | OR [95% CI] |
|----------------------------------------------------|-----------------|--------------------|---------|-------------|
| Practice location                                  |                 |                    |         |             |
| Urban practice                                     | 161 (85.6%)     | 82 (92.1%)         | 0.18    | -           |
| More than one practice location                    | 60 (31.9%)      | 37 (37.1%)         | 0.47    | -           |
| Co-located with other health professionals ('yes') |                 |                    |         |             |
| Osteopath                                          | 98 (52.2%)      | 53 (59.5%)         | 0.30    | -           |
| General Practitioner                               | 15 (7.9%)       | 5 (5.6%)           | 0.64    | -           |
| Specialist Medical Practitioner                    | 4 (2.1%)        | 1 (1.1%)           | 0.92    | -           |
| Podiatrist                                         | 10 (5.3%)       | 8 (9.0%)           | 0.37    | -           |
| Physiotherapist                                    | 25 (13.3%)      | 13 (14.6%)         | 0.91    | -           |
| Chiropractor                                       | 6 (3.2%)        | 5 (5.6%)           | 0.52    | -           |
| Exercise Physiologist                              | 2 (1.0%)        | 2 (2.2%)           | 0.81    | -           |
| Occupational Therapist                             | 3 (1.5%)        | 1 (1.1%)           | 1.00    | -           |
| Psychologist                                       | 26 (13.8%)      | 11 (12.3%)         | 0.88    | -           |
| Massage Therapist                                  | 57 (30.3%)      | 35 (39.3%)         | 0.17    | -           |
| Acupuncturist                                      | 49 (26.0%)      | 23 (25.8%)         | 1.00    | -           |
| Naturopath                                         | 21 (11.1%)      | 13 (14.6%)         | 0.53    | -           |
| Dietician                                          | 4 (2.1%)        | 2 (2.2%)           | 1.00    | -           |
| Nutritionist                                       | 14 (7.4%)       | 6 (6.7%)           | 1.00    | -           |

Table 2. Cont.

|                                                           | Often (n = 188) | Not Often (n = 89) | p-Value | OR [95% CI]        |
|-----------------------------------------------------------|-----------------|--------------------|---------|--------------------|
| Send referrals to other health professionals ('yes')      |                 |                    |         |                    |
| Osteopath                                                 | 121 (64.3%)     | 50 (56.2%)         | 0.24    | -                  |
| General Practitioner                                      | 165 (87.7%)     | 80 (89.9%)         | 0.75    | -                  |
| Specialist Medical Practitioner                           | 147 (78.2%)     | 60 (67.4%)         | 0.07    | -                  |
| Podiatrist                                                | 76 (40.4%)      | 33 (37.1%)         | 0.69    | -                  |
| Physiotherapist                                           | 92 (48.9%)      | 33 (37.1%)         | 0.08    | -                  |
| Chiropractor                                              | 19 (10.1%)      | 3 (3.3%)           | 0.09    | -                  |
| Exercise Physiologist                                     | 15 (7.9%)       | 6 (6.7%)           | 0.90    | -                  |
| Occupational Therapist                                    | 22 (11.7%)      | 4 (4.5%)           | 0.09    | -                  |
| Psychologist                                              | 59 (31.3%)      | 28 (31.4%)         | 1.00    | -                  |
| Massage Therapist                                         | 125 (66.5%)     | 51 (57.3%)         | 0.18    | -                  |
| Acupuncturist                                             | 135 (71.8%)     | 56 (62.9%)         | 0.17    | -                  |
| Naturopath                                                | 76 (40.4%)      | 38 (42.7%)         | 0.82    | -                  |
| Dietician                                                 | 16 (8.5%)       | 5 (5.6%)           | 0.54    | -                  |
| Nutritionist                                              | 43 (22.8%)      | 12 (13.4%)         | 0.09    | -                  |
| Receive referrals from other health professionals ('yes') |                 |                    |         |                    |
| Osteopath                                                 | 149 (79.2%)     | 56 (62.9%)         | <0.01   | 2.25 [1.29–3.92]   |
| General Practitioner                                      | 174 (92.5%)     | 68 (76.4%)         | <0.01   | 3.83 [1.84–7.98]   |
| Specialist Medical Practitioner                           | 66 (35.1%)      | 23 (25.8%)         | 0.16    | -                  |
| Podiatrist                                                | 44 (23.4%)      | 9 (10.1%)          | 0.01    | 2.71 [1.26–5.85]   |
| Physiotherapist                                           | 93 (49.4%)      | 29 (32.5%)         | 0.01    | 2.02 [1.19–3.43]   |
| Chiropractor                                              | 18 (9.5%)       | 3 (3.4%)           | 0.11    | -                  |
| Exercise Physiologist                                     | 14 (7.5%)       | 2 (2.2%)           | 0.14    | -                  |
| Occupational Therapist                                    | 22 (11.7%)      | 3 (3.3%)           | 0.04    | 3.80 [1.10–13.05]  |
| Psychologist                                              | 36 (19.1%)      | 7 (7.8%)           | 0.02    | 2.77 [1.18–6.51]   |
| Massage Therapist                                         | 147 (78.1%)     | 53 (59.5%)         | <0.01   | 2.43 [1.41–4.21]   |
| Acupuncturist                                             | 103 (54.8%)     | 37 (41.5%)         | 0.05    | -                  |
| Naturopath                                                | 70 (37.2%)      | 31 (34.8%)         | 0.80    | -                  |
| Dietician                                                 | 7 (3.7%)        | 1 (1.1%)           | 0.41    | -                  |
| Nutritionist                                              | 20 (10.7%)      | 1 (1.1%)           | 0.01    | 10.40 [1.38–79.36] |
| Diagnostic imaging                                        |                 |                    |         |                    |
| Referral for imaging ('often')                            | 53 (28.2%)      | 13 (14.6%)         | 0.01    | 2.29 [1.17–4.48]   |
| Investigation of unknown pathologies                      | 143 (76.0%)     | 65 (73.0%)         | 0.58    | -                  |
| Investigation of suspected diagnosis                      | 167 (88.8%)     | 80 (89.9%)         | 0.79    | -                  |
| Investigation of potential fractures                      | 160 (85.1%)     | 71 (79.7%)         | 0.26    | -                  |
| Rule out risk factors prior to treatment                  | 76 (40.4%)      | 34 (38.2%)         | 0.72    | -                  |
| General screening of the spine                            | 18 (9.5%)       | 4 (4.5%)           | 0.14    | -                  |
| Patient assessment ('yes')                                |                 |                    |         |                    |
| Orthopaedic testing                                       | 183 (97.3%)     | 85 (95.5%)         | 0.42    | -                  |
| Clinical assessment algorithm                             | 59 (31.3%)      | 25 (28.1%)         | 0.58    | -                  |
| Neurological testing                                      | 179 (95.2%)     | 84 (94.3%)         | 0.77    | -                  |
| Screening questionnaire                                   | 171 (90.9%)     | 76 (85.3%)         | 0.16    | -                  |
| Cranial nerve testing                                     | 126 (67.0%)     | 61 (68.5%)         | 0.80    | -                  |

New Zealand osteopaths who report *often* treating older patients were more likely to report *often* treating patients' post-surgery (OR 3.58) and patients with work injuries (OR 2.21), compared with osteopaths who report *not often* treating older patients (Table 3). Associations were also observed between *often* treating older adults and *often* treating a range of upper and lower extremity complaints.

New Zealand osteopaths who report often treating older patients were more likely to report practicing in an urban location (aOR 3.23), often treating degenerative spinal complaints (aOR 4.13), often treating wrist musculoskeletal complaints (aOR 4.30), and often using exercise prescription (aOR 3.12) compared with New Zealand osteopaths who report not often treating older patients (Table 4). Additionally, New Zealand osteopaths who report often treating older patients were significantly less likely to refer patients to a specialist medical practitioner compared with colleagues who report not often treating older patients (aOR 0.46).

**Table 3.** Clinical management characteristics of New Zealand osteopaths who report *often* treating older patients compared to osteopaths who do *not often* treat older patients.

|                                        | Often (n = 188) | Not Often (n = 89) | p-Value | OR [95%CI]         |
|----------------------------------------|-----------------|--------------------|---------|--------------------|
| Discuss with patients ('often')        |                 |                    |         |                    |
| Diet/nutrition                         | 75 (39.8%)      | 38 (42.7%)         | 0.75    | -                  |
| Smoking                                | 25 (13.3%)      | 12 (13.4%)         | 1.00    | -                  |
| Physical activity                      | 158 (84.0%)     | 77 (86.5%)         | 0.72    | -                  |
| Occupational Health and Safety         | 79 (42.0%)      | 35 (39.3%)         | 0.77    | -                  |
| Pain counselling/education             | 37 (19.7%)      | 20 (22.4%)         | 0.70    | -                  |
| Stress                                 | 98 (52.1%)      | 51 (57.3%)         | 0.50    | -                  |
| Nutritional supplements                | 54 (28.7%)      | 17 (19.1%)         | 0.11    | -                  |
| Medication                             | 75 (39.8%)      | 24 (26.9%)         | 0.05    | -                  |
| Patient subgroups (treat 'often')      |                 |                    |         |                    |
| Up to 3 years of age                   | 53 (28.1%)      | 22 (24.7%)         | 0.64    | -                  |
| 4 to 18 years of age                   | 73 (38.8%)      | 20 (22.4%)         | 0.01    | 2.19 [1.23–3.90]   |
| Pregnancy                              | 56 (29.8%)      | 24 (26.9%)         | 1.00    | -                  |
| Non-English speaking                   | 9 (4.8%)        | 4 (4.5%)           | 0.91    | -                  |
| Sport-related injuries                 | 101 (53.7%)     | 40 (44.9%)         | 0.21    | -                  |
| Chronic pain                           | 101 (53.7%)     | 37 (41.5%)         | 0.08    | -                  |
| Work injury                            | 134 (71.3%)     | 47 (52.8%)         | <0.01   | 2.21 [1.31–3.74]   |
| Traffic injury                         | 57 (30.3%)      | 15 (16.8%)         | 0.02    | 2.15 [1.13–4.05]   |
| Post-surgery                           | 33 (17.5%)      | 5 (5.6%)           | 0.01    | 3.58 [1.35–9.50]   |
| Māori (indigenous population)          | 39 (20.7%)      | 2 (2.2%)           | <0.01   | 11.38 [2.68–48.31] |
| Accident Compensation Commission (ACC) | 168 (89.3%)     | 74 (83.1%)         | 0.21    | -                  |
| Conditions Treated ('often')           |                 |                    |         |                    |
| Neck pain                              | 187 (99.4%)     | 85 (95.5%)         | 0.06    | -                  |
| Thoracic pain                          | 173 (92.0%)     | 73 (82.0%)         | 0.20    | -                  |
| Back pain                              | 185 (98.4%)     | 85 (95.5%)         | 0.30    | -                  |
| Hip pain                               | 138 (73.4%)     | 49 (55.0%)         | <0.01   | 2.25 [1.33–3.82]   |
| Knee pain                              | 106 (56.3%)     | 31 (34.8%)         | <0.01   | 2.42 [1.43–4.08]   |
| Ankle pain                             | 81 (43.0%)      | 23 (25.8%)         | <0.01   | 2.17 [1.24–3.78]   |
| Foot pain                              | 65 (34.5%)      | 13 (14.6%)         | <0.01   | 3.09 [1.59–5.98]   |
| Shoulder pain                          | 163 (86.7%)     | 61 (68.5%)         | <0.01   | 2.99 [1.62–5.53]   |
| Elbow pain                             | 53 (28.2%)      | 11 (12.3%)         | <0.01   | 2.78 [1.37–5.65]   |
| Wrist pain                             | 43 (22.8%)      | 7 (7.8%)           | <0.01   | 3.47 [1.49–8.07]   |
| Hand pain                              | 31 (16.5%)      | 4 (4.5%)           | <0.01   | 4.19 [1.43–12.28]  |
| Postural disorders                     | 111 (59.0%)     | 33 (37.1%)         | <0.01   | 2.44 [1.45–4.11]   |
| Degenerative spine disorders           | 107 (56.9%)     | 22 (24.7%)         | <0.01   | 4.02 [2.29–7.05]   |
| Headache                               | 145 (86.3%)     | 90 (82.6%)         | 0.39    | -                  |
| Migraine disorders                     | 75 (44.6%)      | 32 (29.3%)         | 0.01    | 1.94 [1.16–3.24]   |
| Spine health                           | 98 (52.1%)      | 30 (33.7%)         | <0.01   | 2.14 [1.27–3.61]   |
| Tendinopathies                         | 66 (35.1%)      | 16 (17.8%)         | <0.01   | 2.47 [1.33–4.58]   |
| Temporomandibular joint                | 33 (17.5%)      | 3 (3.3%)           | <0.01   | 6.10 [1.18–20.48]  |
| Non-musculoskeletal                    | 33 (17.5%)      | 11 (12.3%)         | 0.53    | -                  |
| Manual therapy (use 'often')           |                 |                    |         |                    |
| Counterstrain                          | 55 (29.2%)      | 15 (16.8%)         | 0.04    | 2.04 [1.08–3.86]   |
| Muscle energy technique                | 115 (61.7%)     | 52 (58.4%)         | 0.76    | -                  |
| Spinal manipulation                    | 125 (66.5%)     | 43 (48.3%)         | <0.01   | 2.12 [1.27–3.55]   |
| Joint manipulation                     | 111 (59.0%)     | 38 (42.7%)         | 0.01    | 1.93 [1.61–3.22]   |
| Soft tissue technique                  | 167 (88.8%)     | 73 (82.0%)         | 0.17    | -                  |
| Myofascial release                     | 113 (60.1%)     | 53 (59.5%)         | 1.00    | -                  |
| Visceral techniques                    | 43 (22.8%)      | 22 (24.7%)         | 0.85    | -                  |
| Lymphatic pump                         | 19 (10.1%)      | 7 (7.8%)           | 0.70    | -                  |
| Autonomic balancing                    | 39 (20.7%)      | 16 (17.9%)         | 0.70    | -                  |
| Biodynamics                            | 35 (18.6%)      | 15 (16.8%)         | 0.85    | -                  |
| Functional technique                   | 81 (43.1%)      | 43 (48.3%)         | 0.49    | -                  |
| Osteopathy in the Cranial Field        | 91 (48.4%)      | 47 (52.8%)         | 0.58    | -                  |
| Balanced ligamentous tension           | 90 (47.8%)      | 43 (48.3%)         | 1.00    | -                  |
| Chapman's reflexes                     | 8 (4.2%)        | 3 (3.3%)           | 0.98    | -                  |
| Trigger point therapy                  | 64 (34.0%)      | 18 (20.2%)         | 0.03    | 2.03 [1.11–3.70]   |
| Breathing                              | 48 (25.5%)      | 17 (19.1%)         | 0.30    | -                  |
| Facilitated positional release         | 47 (25.0%)      | 22 (24.7%)         | 1.00    | -                  |
| Dry needling                           | 11 (5.8%)       | 3 (3.3%)           | 0.56    | -                  |
| Exercise prescription                  | 160 (85.1%)     | 58 (65.2%)         | <0.01   | 3.05 [1.70–5.52]   |
| Shockwave therapy                      | 2 (1.0%)        | 0                  | 0.83    | -                  |
| Ultrasound                             | 1 (0.5%)        | 0                  | 1.00    | -                  |
| TENS                                   | 7 (3.7%)        | 0                  | 0.15    | -                  |
| Instrument-assisted soft tissue        | 1 (0.5%)        | 1 (1.1%)           | 1.00    | -                  |
| Sport taping                           | 19 (10.1%)      | 9 (10.1%)          | 1.00    | -                  |

**Table 4.** Statistically significant variables and their associated odds ratios for New Zealand osteopaths who *often* treat older patients.

|                                                           | Odds Ratio (ORa) | 95% Confidence Interval |       | <i>p</i> -Value |
|-----------------------------------------------------------|------------------|-------------------------|-------|-----------------|
|                                                           |                  | Lower                   | Upper |                 |
| Age                                                       | 1.04             | 1.01                    | 1.07  | 0.001           |
| Practice in an urban location                             | 3.23             | 1.17                    | 8.95  | 0.024           |
| Send referrals to a specialist medical practitioner (yes) | 0.46             | 0.23                    | 0.91  | 0.026           |
| Treat wrist musculoskeletal complaints (often)            | 4.30             | 1.50                    | 12.33 | 0.007           |
| Treat degenerative spinal complaints (often)              | 4.14             | 2.12                    | 8.08  | <0.01           |
| Use spinal manipulation (often)                           | 1.91             | 1.00                    | 3.63  | 0.048           |
| Use exercise prescription (often)                         | 3.12             | 1.54                    | 6.34  | 0.002           |

## 4. Discussion

Our study is the first to describe the New Zealand osteopathy workforce contributing to the management of older adult patients. The current work identified several characteristics associated with osteopaths who *often* treat older adult patients through a nationally representative sample of the profession. Our findings indicate that osteopaths who report treating older adults *often* differed from those who do not in the following domains: (1) personal and practice profile, (2) management strategies, and (3) referral patterns.

### 4.1. Personal and Practice Profile

New Zealand osteopaths who reported *often* treating older patients were more likely to be older with more professional experience. This is similar to observations in the Australian osteopathy PBRN, where osteopaths treating older adults have been in clinical practice for longer [3]. These findings indicate an association between practitioner age, clinical experience, and the frequent management of older adults. The present data cannot determine whether this reflects patient preference, practitioner interest or expertise, referral patterns, practice location, or other unmeasured factors. There is also evidence that older patients seek care for musculoskeletal complaints based on recommendations from their family and social circle rather than practitioners' treatment approaches [15]. Whether the aforementioned factors are consistent with other health professions requires additional research, which may help better inform musculoskeletal care for older adults.

Practicing in an urban location was observed to be a statistically significant predictor of New Zealand osteopaths *often* treating older adults. Most osteopaths in New Zealand practice in an urban location (88.5%), suggesting that the result is likely due to the accessibility of osteopathy care in urban versus rural settings, and that over 60% of older New Zealanders live in a medium to large urban location [16]. This observation is different to that reported by Vaughan et al. [17] in the Australian osteopathy PBRN, where rural practitioners were more likely to report often treating older adults, supporting the accessibility assertion that over 18% of Australian osteopaths reported working in rural locations. Significant challenges to improving access to osteopathic care in rural areas are practitioner recruitment and retention. These issues have been identified not only in medicine and nursing in New Zealand but also in allied health, with calls to action to recognise 'rural generalists' and/or extended scopes of practice to incentivise practitioners to provide care in rural New Zealand [18]. Another issue for the New Zealand osteopathic profession is that there is only one local pre-professional osteopathy education programme, meaning immigration may be a key strategy to improving access to osteopathic care in rural areas. Given the small footprint of osteopaths in rural New Zealand and the likely limited access for older adults, it is important to continue exploring the place of osteopathy in allied health in New Zealand to inform health workforce policies.

#### 4.2. Management Strategies

New Zealand osteopaths who report *often* treating older patients also identified often treating degenerative spinal complaints and wrist complaints. Diagnosed degenerative spinal complaints affect approximately 25% of the population, with incidence increasing with age [19]. This broad category of complaint covers cervical, thoracic and lumbar degeneration, so it is possible that New Zealand osteopaths are often managing older patients with these issues. A variety of evidence underpinning the effectiveness of treatments utilised by osteopaths exists, such as manual therapy and exercise [20–22]. Work by Molinari, Mingrone and Novelli [9] synthesised the clinical evidence for osteopathic manual treatment (OMT) in older adults, providing a useful international framework against which the present findings can be contextualised. The profile of New Zealand osteopaths described in the current work appears broadly consistent with international trends in osteopathic care for older populations, though direct comparisons are limited by differences in study design and healthcare context. This evidence highlights the potential roles that osteopaths can fulfil in managing musculoskeletal issues, such as chronic mechanical back/neck pain, by facilitating positive treatment outcomes.

New Zealand osteopaths who *often* treat older adults were more likely to report often treating wrist musculoskeletal complaints compared with colleagues who reported *not often* treating older adults. Several contextual factors may explain why osteopaths who frequently manage older adults are disproportionately likely to treat wrist complaints in this population. First, wrist and hand osteoarthritis is among the most prevalent musculoskeletal conditions in older adults [23], disproportionately affecting the carpometacarpal, radiocarpal, and interphalangeal joints, and is associated with significant pain, reduced grip strength, impaired pinch function, and loss of independence in daily living [24]. Given that osteopathic care integrates manual therapy with exercise rehabilitation, it may be particularly well suited to addressing the functional deficits associated with wrist osteoarthritis, where both joint mobility and neuromuscular function are commonly compromised [24–26]. Second, the prevalence of carpal tunnel syndrome increases with advancing age and is associated with conditions common in older adults, including diabetes, hypothyroidism, and inflammatory arthropathies [23]. Conservative management of carpal tunnel syndrome, including manual therapy directed at the wrist and surrounding structures, has demonstrated benefits in reducing pain and improving nerve conduction [23], and osteopaths may be well positioned to contribute to this aspect of care within a multidisciplinary framework. Taken together, these mechanisms suggest that the association between frequently treating older adults and frequently treating wrist complaints likely reflects the convergence of age-related degenerative pathology and post-acute rehabilitation needs within this patient population, rather than representing an incidental finding. The integration of osteopathic treatment with targeted exercise rehabilitation may offer particular value in restoring wrist function and supporting independence in older adults. How New Zealand osteopaths approach the management of wrist complaints in older adults, in addition to other populations, requires additional investigation to understand how this condition is managed in practice and the outcomes of this care.

Often using exercise prescription for patient care was a statistically significant predictor of New Zealand osteopaths often treating older adults. Over 75% of the New Zealand osteopathy profession use exercise prescription in the care of older adults [13], suggesting that this is a common intervention for patient care [27]. Exercise prescription for general fitness or as a condition-specific intervention is reported to be a valuable and cost-effective intervention for older adults [28,29]. Exercise programmes can reduce the risk of falling [11], improve chronic disease symptoms, and maintain functional independence [30] in older adults, providing osteopaths treating older people with key therapeutic goals. New Zealand

osteopaths may be using exercise prescriptions to address both these areas in patient care; however, this assertion requires additional investigation beyond the self-reported data presented by Mistry, Bacon and Moran [27].

Often using spinal manipulation was another significant predictor of New Zealand osteopaths *often* treating older adults. Spinal manipulation is a technique widely used by osteopaths in New Zealand [13] to improve range of motion and reduce pain. There is evidence supporting the use of spinal manipulation in older adults with a minimal adverse event profile [31], alongside the positive benefits reported when spinal manipulation and exercise prescription are combined [28]. When and why New Zealand osteopaths choose to use spinal manipulation in older adults would be valuable to investigate in order to better understand how it is used in the context of an osteopathy consultation, how spinal manipulation might improve patient outcomes, and the adverse event profile of its application in the care of older adults with spinal musculoskeletal complaints. That said, one of the observations from the current study was that osteopaths who often treat older adults are more likely to treat degenerative spinal complaints, and it may be in this context, amongst other spinal complaints, that osteopaths are using spinal manipulation. Again, this assertion requires additional investigation.

#### 4.3. Referral Patterns

Our results show that osteopaths who *often* treat older adults are more likely to receive referrals from general practitioners, psychologists, and podiatrists and *often* refer for diagnostic imaging compared with osteopaths who report not often treating older patients. Musculoskeletal conditions and chronic diseases frequently co-occur, doubling the likelihood of individuals with musculoskeletal conditions also having chronic diseases in other body systems, including heart disease, neurological disorders, endocrine disorders, and gastric ulcers [32]. The care of older adults requires multidisciplinary care and collaboration with other healthcare professionals to manage chronic conditions, which can explain this association. The World Health Organization [33] has published updated recommendations for the non-surgical treatment and management of chronic lower back pain in adults, including older adults. The recommendations advocate for a holistic, integrated, and well-coordinated approach to patient care. It may be that other health practitioners refer to osteopaths due to their holistic approach. Moreover, New Zealand osteopaths who report often treating older patients were significantly less likely to refer patients to a specialist medical practitioner compared with colleagues who report not often treating older patients. This might occur due to difficulty accessing specialist care, increased costs, or the need to be referred to general practitioners first and then referred to specialists. We can also hypothesise that longer-term complaints managed by an osteopath may reduce the need for specialist medical care. It would be of value to explore the reasons for referral and whether the osteopathy workforce could contribute to reducing the escalating burden of older adults' complaints and their associated costs of care.

The finding that New Zealand osteopaths frequently combine manual therapy with exercise prescription, lifestyle advice, and health education is consistent with the increasingly multidimensional nature of contemporary osteopathic practice documented in the OIA Global Review [34]. However, this broad scope of practice raises important questions regarding professional boundaries and the distinctive contribution of osteopathy within multidisciplinary healthcare systems. Toloui-Wallace et al. [35] observed that co-located osteopaths, chiropractors, and physiotherapists exhibit shifting professional boundaries, with overlapping scopes of practice simultaneously facilitating interprofessional collaboration and potentially obscuring the distinctive contributions of individual professions. Against this background, it is useful to consider which elements of the care delivered by

New Zealand osteopaths represent shared or collaborative competencies (e.g., exercise promotion, functional assessment, and health education) and which may represent more distinctively osteopathic contributions, such as the integration of osteopathic manipulative treatment within functional movement assessment and patient-centred management. Dib and Belrhiti [36] emphasise that effective interprofessional practice relies on clearly defined professional roles combined with the mutual recognition of complementary expertise, and future research should seek to clarify how osteopaths articulate and communicate their distinctive contributions within integrated care teams for older adults.

#### *4.4. Within Health and Social Frameworks*

The findings of this study may also be considered to fall within the value-based healthcare paradigm proposed by Porter [37], which frames value as the health outcomes achieved relative to the costs of care. Osteopathic care for older adults, characterised by manual therapy, exercise prescription, and holistic patient management, may generate value through several mechanisms. In terms of tertiary prevention, osteopathic interventions may reduce the functional impact of existing musculoskeletal conditions such as degenerative spinal disease and wrist complaints, thereby supporting independence and quality of life [38]. Compared with other allied health professions such as physiotherapy or exercise physiology, the distinctive contribution of osteopathy may lie in the integration of manual assessment and treatment with broader lifestyle and functional management within a single, holistic consultation framework.

More broadly, the role of osteopaths in the care of older adults may be considered within the context of the Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-Being), and the goal of universal health coverage [39]. As populations age globally, health systems face increasing pressure to deliver effective, accessible, and sustainable musculoskeletal care. Osteopathic practice, with its emphasis on conservative management, patient education [12], and multidisciplinary collaboration [40], may contribute to health system sustainability by supporting the prevention and management of musculoskeletal and non-communicable diseases in older adults while minimising reliance on pharmacological or surgical interventions.

#### *4.5. Temporal Considerations*

It is important to contextualise these findings within the temporal gap between data collection and publication. The data presented here were collected between August and December 2018, and the New Zealand osteopathic workforce and broader healthcare environment have changed substantially in the intervening years. In particular, the COVID-19 pandemic had a lasting impact on clinical practice across all health professions, including shifts in older adults' healthcare utilisation patterns. Older adults were disproportionately affected by the pandemic, both directly through elevated clinical risk and indirectly through social isolation, reduced access to in-person care, and physical deconditioning [41]. It is plausible that some of the practice characteristics and referral patterns described in this study may have evolved since 2018. These findings should therefore be interpreted as a historical baseline that describes the New Zealand osteopathic workforce at a specific point in time, rather than as a current profile of contemporary practice. Updated data collection through the ORC-NZ PBRN would be valuable to assess whether the associations identified here remain stable in the post-pandemic clinical landscape and to capture any structural changes to osteopathic practice in New Zealand that may have occurred in the intervening period.

#### 4.6. Limitations

Limitations of the study relate to using a self-report survey design for the ORC-NZ practice questionnaire. This design has the potential to be influenced by acquiescence and social desirability biases. Further, there may be variability in how the ORC-NZ practice questionnaire items are interpreted by individual respondents. Although these limitations should be considered, the findings provide insight into key practice characteristics of New Zealand osteopaths who commonly manage older adults. However, the questionnaire used to collect the data analysed in this study has not been psychometrically validated.

### 5. Conclusions

This work is the first to describe the characteristics of New Zealand osteopaths who report *often* treating older adults. Using data from the ORC-NZ practice-based research network, several independent predictors of osteopaths who frequently treat older adults were identified. Practicing in an urban location, frequently managing degenerative spinal complaints and wrist musculoskeletal complaints, and regularly using exercise prescription and spinal manipulation were each significantly and independently associated with frequently treating older adult patients. The strength of the associations observed for degenerative spinal complaints and wrist complaints in particular suggests that these condition types are central to the clinical profile of New Zealand osteopaths engaged in older adult care and that osteopathic practice in this population is characterised by a combination of manual therapy and exercise-based approaches consistent with current evidence-based recommendations for musculoskeletal management in older adults.

The referral patterns identified in this study further suggest that osteopaths who frequently treat older adults are embedded within broader multidisciplinary care networks, receiving referrals from general practitioners, podiatrists, and psychologists, whilst being less likely to refer onwards to specialist medical practitioners. This pattern is consistent with osteopaths functioning as a conservative, patient-centred management option within integrated care pathways for older adults, potentially contributing to tertiary and quaternary prevention by reducing the functional impact of existing musculoskeletal conditions and avoiding unnecessary escalation of care.

These findings have direct implications for health workforce planning, interprofessional collaboration, and the development of osteopathy-specific clinical guidelines for older adult care in New Zealand and internationally. As the proportion of older adults in the New Zealand population continues to grow, understanding and optimising the contribution of osteopaths within multidisciplinary care systems will become increasingly important. The present study provides a foundation for this work, and future research should seek to update these findings using contemporary data, explore the clinical reasoning and patient outcomes associated with the identified practice patterns, and further clarify the distinctive contribution of osteopathy within integrated models of care for ageing populations.

**Author Contributions:** Conceptualisation, A.P.A.F., M.F. and B.V.; methodology, M.F. and B.V.; formal analysis, B.V.; data curation, B.V.; writing—original draft preparation, A.P.A.F. and B.V.; writing—review and editing, A.P.A.F., M.F., L.M., J.F., K.K.S. and B.V.; project administration, B.V. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the University of Technology Sydney (ETH19-3435, 26 November 2019).

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The datasets analysed during the current study are not publicly available as the authors do not have the authority to disseminate the data. The dataset is available upon reasonable request from arccim@uts.edu.au.

**Acknowledgments:** The researchers would like to acknowledge the initial assistance of Amie Steel in facilitating access to the dataset analysed as part of the study.

**Conflicts of Interest:** The authors declare no conflicts of interest.

## Abbreviations

The following abbreviations are used in this manuscript:

|        |                                         |
|--------|-----------------------------------------|
| OR     | Odds ratio                              |
| ORa    | Adjusted odds ratio                     |
| ORC-NZ | Osteopathy Research Connect—New Zealand |
| PBRN   | Practice-based research network         |

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