

## CHAPTER 4

### RESULTS

#### 4.1 Demographics of participants

Participant demographics and neck pain features are presented in Table 2. There were no significant differences between the groups in age, BMI and co-morbid musculoskeletal pain (all  $p > 0.05$ ).

Table 2 Demographic data of participants

| Variables                 | Neck pain<br>(n = 30) | Controls<br>(n =30) | <i>p</i> -value |
|---------------------------|-----------------------|---------------------|-----------------|
| Age (yrs)                 | 69.2 ± 3.7            | 70.6 ± 3.4          | 0.10            |
| BMI (kg/m <sup>2</sup> )  | 24.2 ± 3.5            | 24.4 ± 3.7          | 0.81            |
| History of neck pain (mo) | 41.3 ± 76.5           | -                   | -               |
| NDI (0-100)               | 24.4 ± 12.2           | -                   | -               |
| VAS (0-10)                |                       |                     |                 |
| - on the testing day      | 4.2 ± 2.5             | -                   | -               |
| - on average              | 4.4 ± 2.1             | -                   | -               |
| - pain at its worst       | 6.7 ± 2.4             | -                   | -               |
| Co-morbid pain (n)        | 24                    | 19                  | 0.15            |

Values are presented as mean ± SD unless otherwise indicated

#### 4.2 Psychological features

The results of Independent *t*-test revealed no significant differences between groups for TGDS, STAI-state and STAI-trait scores (all  $p > 0.05$ ). The mean values and standard deviations of TGDS, STAI-state and STAI-trait scores are presented in Table 3.

Table 3 Psychological features between elders with and without neck pain

|                          | Neck pain<br>(n = 30) | Controls<br>(n = 30) | <i>p</i> -value |
|--------------------------|-----------------------|----------------------|-----------------|
| TGDS score (0-30)        | 5.0 ± 4.2             | 3.2 ± 3.3            | 0.07            |
| STAI-state score (20-80) | 35.5 ± 8.8            | 32.7 ± 7.1           | 0.19            |
| STAI-trait score (20-80) | 34.1 ± 8.0            | 32.7 ± 7.6           | 0.48            |

Values are presented as mean ± SD unless otherwise indicated

#### 4.3 QST measurements

Dependent *t*-test revealed no significant differences in PPTs between left and right sides over the articular pillars of C5-C6 and tibialis anterior muscle (all  $p > 0.05$ ). The results of Wilcoxon Signed-Ranks test revealed no significant differences in HPTs, CPTs and supra-threshold heat pain ratings between left and right sides over the articular pillars of C5-C6 and tibialis anterior muscle (all  $p > 0.05$ ). The results of all QST measurements between left and right sides are presented in Table 4.

As there were no differences between left and right sides at any site for the QST outcomes, the mean values of the QST of both sides were used for between-group comparisons. Although a trend for significant difference in HPTs between left and right sides at the cervical spine was seen, it is unlikely to be of a clinically significant difference. The preliminary analyses also revealed no effects of the TGDS, STAI-state and STAI-trait scores as well as the presence of co-morbid musculoskeletal pain on the PPTs, HPTs, CPTs and supra-threshold heat pain ratings (all  $p > 0.05$ ). Thus the effects of these variables were not considered for further analyses.

#### 4.3.1 Pressure pain thresholds (PPTs)

The result of Independent  $t$ -test revealed that elders with chronic idiopathic neck pain had significantly lower PPTs over the articular pillars of C5-C6 compared to controls ( $p < 0.05$ ). There were no significant differences in PPTs over the tibialis anterior muscle between the two groups ( $p > 0.05$ ). The mean values and standard deviations for the PPTs between the neck pain and control groups are presented in Table 5.

#### 4.3.2 Thermal pain thresholds (TPTs)

The results of Mann-Whitney U test revealed that elders with chronic idiopathic neck pain had significantly lower CPTs over the cervical spine and tibialis anterior muscle (both  $p < 0.05$ ) when compared with elders without chronic idiopathic neck pain. There were no significant between group differences in HPTs over the cervical spine and tibialis anterior muscle (both  $p > 0.05$ ). The mean values and standard deviations of HPTs and CPTs for all sites are presented in Table 5.

#### 4.3.3 Supra-threshold heat pain ratings

Mann-Whitney U test revealed no significant differences between groups for supra-threshold heat pain ratings at 45°C, 47°C and 49°C over the cervical spine and tibialis anterior muscle (all  $p > 0.05$ ). The mean values and standard deviations for the supra-threshold heat pain ratings are presented in Table 5.

Table 4 QST measurements between the left and right sides of all sites

|  | Cervical spine |              |                 | Tibialis anterior muscle |               |                 |
|--|----------------|--------------|-----------------|--------------------------|---------------|-----------------|
|  | Left           | Right        | <i>p</i> -value | Left                     | Right         | <i>p</i> -value |
| <b>Pain thresholds</b>                           |                |              |                 |                          |               |                 |
| PPTs (kPa)                                       | 326.7 ± 83.4   | 336.9 ± 89.2 | 0.86            | 483.5 ± 132.8            | 487.0 ± 127.8 | 0.75            |
| HPTs (°C)  | 47.5 ± 2.0     | 47.6 ± 2.2   | 0.06            | 48.1 ± 1.5               | 48.3 ± 1.1    | 0.24            |
| CPTs (°C)  | 1.9 ± 3.5      | 1.6 ± 2.4    | 0.36            | 1.0 ± 2.6                | 0.9 ± 2.7     | 0.86            |
| <b>Supra-threshold heat pain ratings (0-100)</b> |                |              |                 |                          |               |                 |
| at 45°C  | 64.5 ± 22.4    | 66.5 ± 22.2  | 0.11            | 51.8 ± 21.1              | 51.1 ± 19.8   | 0.99            |
| at 47°C  | 74.1 ± 21.0    | 74.7 ± 20.1  | 0.60            | 68.5 ± 20.3              | 70.8 ± 18.8   | 0.34            |
| at 49°C  | 90.2 ± 19.1    | 91.4 ± 18.2  | 0.22            | 91.4 ± 18.4              | 91.3 ± 17.0   | 0.49            |

Values are presented as mean ± SD unless otherwise indicated

Table 5 QST measurements between elders with and without neck pain for all sites

|   | Cervical spine        |                      |                 | Tibialis anterior muscle |                      |                 |
|---|-----------------------|----------------------|-----------------|--------------------------|----------------------|-----------------|
|   | Neck pain<br>(n = 30) | Controls<br>(n = 30) | <i>p</i> -value | Neck pain<br>(n = 30)    | Controls<br>(n = 30) | <i>p</i> -value |
| Pain thresholds                           |                       |                      |                 |                          |                      |                 |
| PPTs (kPa)                                | 287.0 ± 58.0          | 376.5 ± 81.4         | 0.00            | 482.2 ± 129.0            | 488.3 ± 119.5        | 0.85            |
| HPTs (°C)                                 | 47.3 ± 2.7            | 47.8 ± 1.1           | 0.74            | 47.9 ± 1.4               | 48.5 ± 0.8           | 0.13            |
| CPTs (°C)                                 | 3.0 ± 3.5             | 0.5 ± 1.0            | 0.00            | 1.5 ± 3.2                | 0.4 ± 1.5            | 0.02            |
| Supra-threshold heat pain ratings (0-100) |                       |                      |                 |                          |                      |                 |
| at 45°C                                   | 64.4 ± 22.7           | 66.6 ± 21.2          | 0.77            | 53.3 ± 20.1              | 49.6 ± 19.4          | 0.52            |
| at 47°C                                   | 74.2 ± 19.8           | 74.6 ± 20.8          | 0.94            | 71.3 ± 17.3              | 68.0 ± 18.3          | 0.51            |
| at 49°C                                   | 92.3 ± 16.5           | 89.3 ± 20.0          | 0.67            | 93.0 ± 14.5              | 89.8 ± 19.8          | 0.59            |

Values are presented as mean ± SD unless otherwise indicated