The prevalence of back and leg pain and the cross-sectional association with adverse health outcomes in community dwelling older adults in England

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Abstract

Study Design: Cross-sectional analysis of the Oxford Pain, Activity and Lifestyle (OPAL) Cohort Study

Summary of background data: Epidemiological data describing the prevalence of back pain (BP) and leg pain in older adults in England is lacking.

Objective: To assess the prevalence of BP and leg pain and determine their relationship with adverse health states among older adults in England.

Methods: 5,304 community-dwelling adults (aged 65-100 years) enrolled in the OPAL cohort study who provided data on BP and leg pain were included. Participants were classified into four groups based on reports of back and leg pain: 1) no BP, 2) BP only, 3) BP and leg pain which was likely to be neurogenic claudication (NC), 4) and BP and leg pain which was not NC. Adverse health states were frailty, falls, mobility decline, low walking confidence, poor sleep quality and urinary incontinence. We collected demographic and socioeconomic information, health-related quality of life and existing health conditions, and estimated the association between BP presentations and adverse health states using regression analysis.

Results: Thirty-four percent of participants (1,786/5,304) reported BP only, 11.2% (n=594/5,304) reported BP and NC and 8.3% (n=441/5,304) reported BP and non-NC leg pain. Participants with BP had worse quality of life compared to those without BP. All BP presentations were significantly associated with adverse health states. Those with NC were most affected. In particular, there was greater relative risk (RR) of low walking confidence (RR 95% CI 3.11 [2.56-3.78]), frailty (RR 95% CI 1.88 [1.67-2.11]) and mobility decline (RR 95%CI 1.74 [1.54-1.97]) compared to no BP.

Conclusion: Back and leg pain is a common problem for older adults and associated with reduced quality of life and adverse health states. Findings suggest a need to develop more effective treatment for older adults with back pain especially for those with neurogenic claudication.

Key words (10-15): Older adults, Back pain, leg pain, neurogenic claudication, spinal stenosis, adverse health states, frailty, falls, mobility decline

Level of Evidence: Level 2

Key Points (3-5 main points of the article)

Key Points.

- Back and leg pain is a common problem for community dwelling older adults and for many it is a long-standing problem with few reporting an improving clinical picture especially for participants with symptoms of neurogenic claudication.
- Older adults with back and leg pain report lower health related quality of life and the worst quality of life was reported by participants with neurogenic claudication.
- The report of back and leg pain is associated with adverse health states including frailty, falls and mobility decline compared to no report of back pain.
- Participants reporting symptoms of neurogenic claudication represented the greatest proportion of respondents reporting two or more adverse health states and the strongest associations were with mobility related adverse outcomes.
- There is a need to develop more effective treatment for older adults with back and leg pain, especially, for those with neurogenic claudication.

Mini Abstract/Précis.

This study investigated the prevalence of back and leg pain in older adults and the association with adverse health states including frailty, falls and immobility. The report of back and leg pain was associated with adverse health states. The associations were strongest in participants reporting neurogenic claudication.

Word count = 3058

Introduction

In the United Kingdom (UK), approximately one quarter of older adults suffer from back pain (BP).[1,2] Older adults may also experience leg pain referred from the lumbar spine of which neurogenic claudication (NC) due to spinal stenosis is a common cause.[3] NC is the most common reason that older adults undergo spinal surgery.[4] It is estimated that 11% of community dwelling older adults report symptoms of NC, but there are no estimates from community dwelling UK populations.[5] A single UK based study (n=30) estimated the prevalence of NC amongst patients (50 years and over) presenting with back and leg pain to primary care to be 87%.[6]

Little is also known about the relationship between BP and different patterns of leg pain and adverse health states including frailty, mobility decline, falls, poor sleep quality and incontinence. BP in older adults is associated with frailty, falls and immobility.[7-11] BP and leg pain have been associated with falls and functional difficulties but studies are limited in this area.[12] To the best of our knowledge, no studies have investigated the association between BP and different patterns of leg pain with adverse health states. It is unknown if individuals with certain presentations (leg pain consistent with neurogenic claudication versus leg pain which is not neurogenic claudication) are more likely to report adverse health states. Improving our understanding of the presentations of BP and leg pain in older adults has the potential to help develop more effective interventions. Therefore, the aims of this study are to 1) describe the prevalence of BP and leg pain in a cohort of community dwelling older adults in England and 2) estimate the association between BP and leg pain presentations and adverse health states.

Materials and methods

Study design and participants

The Oxford Pain, Activity and Lifestyle (OPAL) cohort study is a prospective cohort study of community dwelling older adults in England, UK. We sampled people (65 years and over) from 35 general practices in England. Each practice selected a random sample of 400 community dwelling practice registrants stratified by age (65-74 years, ≥75 years). Between June 2016 and August 2018, general practices invited 12,839 patients to participate in this study. Potential participants received an information leaflet consent form and baseline questionnaire. Those who returned a completed consent form and questionnaire to the study office were enrolled in the study. Forty-two percent (5,409/12,839) of individuals invited were enrolled in the study. Ninety-eight percent of cohort study participants (5,304/5,409) provided data on back and leg pain and were included in this analysis.

Ethical approval

The London - Brent Research Ethics Committee (16/LO/0348) approved this study on the 10th March 2016.

Data collection and definition of variables

Dependent variables: adverse health states

The Tilburg Frailty Indicator is a multidimensional self-reported measure of frailty and consists of three domains (physical, psychological and social) providing a total score out of 15.[13,14] A score of ≥5 identifies an individual as frail.[13] Mobility decline was assessed by asking: "Compared to one year ago, how would you rate your walking in general?" using a 5-point scale constructed for the study. Participants reporting worsening of walking was classified as having mobility decline. Participants rated their confidence to walk half a mile using a question from the Modified Gait Self-efficacy Scale.[15] Falls in the last year were collected using Prevention of Falls Network Europe recommendations by asking, "In the last 12 months, have you had any fall including a slip or trip following which you have come to rest on the ground, floor or lower level?".[16] Incontinence was reported using the urinary

incontinence item from the Barthel Index.[17,18] Participants reported frequency of urinary incontinence (never, less than once per week, less than once per day, more often or uses a catheter). Participants who selected never or less than once per week were considered continent and the remaining participants were considered incontinent. Participants rated their sleep quality (very good, fairly good, fairly bad or very bad) during the past month using the sleep quality overall rating from Pittsburgh Sleep Quality Index.[19] Participants who reported fairly bad or very bad sleep quality were classified as 'poor sleep quality'.

Independent variable: Back and leg pain

Participants were asked if they were troubled by BP or related symptoms. If 'yes', the participant was asked about frequency (every day, most days, some days, few days, rarely), troublesomeness (intensity) (extremely, very, moderately, slightly, not at all) [20] and spread into the legs over the last 6 weeks. They were asked about the age when they were first troubled by BP (onset) and its pattern since onset (getting better, getting worse, fairly constant, come and goes over time). NC is defined as the presence of BP or other symptoms that travel from the back into the buttocks or legs, and are worse when standing and/or walking and better when sitting and/or bending.[21] Using this definition, participants reporting leg pain made worse by standing or walking and made better with sitting or bending were classified as having leg pain likely to be NC.[21] The questions used to identify those with NC are commonly used in clinical practice and been shown to have high sensitivity and specificity to identify people with symptoms arising from spinal stenosis.[21]

We divided the sample into four mutually exclusive groups:

1. No BP (reference category)

2. BP only

3. BP and NC

4. BP and leg pain that is not NC (non-NC)

Covariates

Demographic factors included age, sex and education. Self-reported height and weight were used to calculate Body Mass Index (BMI). Socioeconomic status was determined using the Index of Multiple Deprivation (IMD) (0-100 score) based on the participant's postcode.[22] A higher score indicates greater deprivation. Due to skewed distribution of the IMD score, we divided it into four categories based on the standard deviation (SD) of the OPAL sample: Category-1 (0 to 1-SD; reference category (most affluent)), Category-2 (1 to 2 SD), Category-3 (2 to 3 SD) and Category-4 (≥3 SD). A SD of 14.11 was used.

Participants were classified as ex/current smokers or never smoked.[23] Participants rated the physical demands of their main occupation during their life which was classified as very light/light, moderate and strenuous/very strenuous.

Participants indicated if their doctor or nurse had told them that they had any of the following health conditions: arthritis, angina or heart troubles, cancer, chronic lung disease, diabetes, digestive problems, high blood pressure, osteoporosis, Parkinson disease, peripheral vascular disease and stroke. The total number of comorbidities was then calculated. We measured the presence of multi-site pain over the last 6 weeks using an adapted version of the Nordic Pain Questionnaire.[24,25] Participants reported if they have experienced pain in 6 different body sites (neck, shoulders, elbows, hands/wrist, hips, knees, feet/ankles).

Other descriptive variables

The EQ5D-5L was used to measure health related quality of life.[26] Responses from the five domains (pain, mobility, self-care, usual activities, and anxiety and depression) were converted into a single EQ-5D index value using the EQ-5D-5L Crosswalk Index Value Calculator to produce a final QoL value.[27] Participants also completed the Clock Drawing Test which is a nonverbal test of cognitive function used in primary care to screen for cognitive impairment.[28] . Participants were asked to draw the face

of a clock depicting the time "10 after 11". There is a 6-point scoring system and participants with a score of 4 or below were classified as having reduced cognitive function.

Statistical analysis

Descriptive statistics were used to summarise the characteristics of participants. Modified Poisson and ordered logistic regression analyses were conducted to assess the relationship between BP groups (independent variable) and adverse health states (dependent variables). Models were adjusted for demographic, lifestyle factors, comorbidities and multi-site pain. We used multiple imputation by chained equations to handle missing data (see supplementary Text S1 and Table S1).[29,30] A complete case analysis was also performed to understand the impact of missing data on the findings. Data analysis was performed using Stata software version 15.1 (StataCorp, College Station, Texas).

Results

Participants' characteristics

The mean age of participants was 75±6.8 years. Over half of the participants reported BP with 33.7% (1,786/5,304) reporting BP only, 11.2% (n=594/5,304) reporting BP and NC and 8.3% (n=441/5,304) reporting BP and non-NC leg pain (Figure 1). Only the prevalence of BP and NC increased with age. BP was more common in females and those reporting more comorbidities (Table 1). Those with leg pain reported poorer health behaviours (smoked more, higher BMI), lived in more deprived areas, reported lower education levels and a greater proportion reported doing more physically demanding work. Participants with BP had lower quality of life across all domains of the EQ5D-5L compared to participants without BP. Quality of life was poorest in those with BP and NC. The majority of participants cohort presented with high cognitive function with 85% (n=4544/5304) having a score of 5 or 6 on the Clock Drawing Test. There was slightly higher prevalence of reduced cognitive function in participants with leg pain.

Back pain symptom presentation

The age of onset was similar across BP groups. Around 30% of participants reported that their BP started 25 years ago or more (Table 2). Those with leg pain reported more frequent BP than participants only reporting BP. A report of pain on most/every day was most common amongst those with NC (Table 2). Participants with NC reported the highest ratings of pain troublesomeness. Very few reported improving symptoms since onset and, most commonly, symptoms fluctuated over time. The proportion of participants reporting persistent pain or pain getting worse since onset was highest in those with NC.

Adverse health states

Fifty-five percent of participants (2,937/5,304) reported at least one adverse health state (Table 1). The most common adverse health states reported were a fall in the last year (29%; 1,534/5,304) and being frail (27%; 1,433/5,304). Urinary incontinence was the least commonly reported (10%; 534/5,304). Confidence to walk half a mile was generally high amongst the cohort with the exception of those reporting NC. Across the three BP groups, there was a greater prevalence of all adverse health states compared to those with no BP and this increased further among those who reported leg pain and highest amongst those with NC. Participants with BP reported more adverse health states than without BP. Those with NC had the greatest proportion of participants reporting two or more adverse health states. When two or more adverse health states were reported (1,661/5,304), the most three most commonly reported combinations were 1) having a fall in the last year and mobility decline (6.8%, 113/1,661), 2) being frail and mobility decline (6.7%, 111/1,661) and 3) being frail, mobility decline and a fall in the last year (6.3%, 105/1,661)

After adjusting for demographics, lifestyle factors, comorbidities and multi-site pain, all BP groups were associated with the adverse health states studied (Table 3). For all the adverse health states,

there was an increase in the strength of association with the addition of leg pain. This was particularly noticeable in participants with NC where we observed the strongest associations with frailty (RR 95% CI 1.88 [1.67-2.11]), mobility decline (RR 95%CI 1.74 [1.54-1.97]), low walking confidence (RR 95% CI 3.11 [2.56-3.78]), and falls (RR 95% CI 1.42 [1.25-1.61]) compared to no BP. The association with poor sleep quality was similar for both types of leg pain while incontinence was greater in those with non-NC leg pain.

Complete case analyses

This study had a small amount of missing data (see supplementary Text S1 and Table S1). Similar effect estimates were obtained from the complete case analyses compared to those obtained using imputed data (Table S2).

Discussion

BP is very common in older adults with approximately half of the participants reporting BP in the last 6 weeks which is higher than previously reported in UK cohorts.[1,2] To the best of our knowledge, this is the first study conducted in England to report on the prevalence of back related leg pain in community dwelling older adults. The total prevalence of leg pain (20%) was similar to that reported within community dwelling cohorts in the USA[12] and the prevalence of NC (11%) was similar to that reported in other countries[5,31,32] For many, BP was long-standing and few reported an improving clinical picture especially those NC. There was a consistent pattern of worse health with the report of leg pain. Those reporting NC had the most severe and frequent BP, worst quality life, more comorbidities and the greatest prevalence of adverse health states. This finding is consistent previous research by Battie et. al. who describes a very substantial burden of illness associated with a diagnosis of lumbar spinal stenosis. [33] Hicks et. al. also found back and leg pain to be associated with increased risk of falls and functional difficulties and those with leg pain were worst affected.[12]

Few studies have compared the impact of distinct patterns of leg pain. This study demonstrates that those with NC were most greatly affected by the majority of adverse health states studied after adjusting for demographic, lifestyle factors, comorbidities and pain at other joints. The biggest difference observed was in mobility related adverse health states (mobility decline and low walking confidence) suggesting that older adults reporting NC are more likely to have poor mobility. Maintaining mobility is integral to retaining active independence in later life and is a priority for older adults.[34,35]

Mobility is also central to the model of frailty as conceptualised by Fried.[35] This model describes the features of frailty as slow speed walking, low physical activity, poor grip strength, unintentional weight loss and self-reported exhaustion.[35] It is unsurprising that the factors related to poor mobility were most strongly associated with NC, as worsening symptoms with walking is a typical presentation.[3]

Frailty and falls were a significant problem for many participants with back and leg pain. Both of which have a substantial impact on the individual and, with an ageing population, an increasing burden on health and care services. The report of adverse health outcomes was common amongst participants and one-third reported more than one so there is potentially some overlap between adverse health states. Based on the Fried Model of frailty, several of the adverse outcomes are conceptually linked within this model. Frail older adults have less capacity to deal with illness or injury making them vulnerable and more likely to experience falls, disability, mobility decline, hospitalisation and the need for nursing home care[36]. One in three adults over the age of 65 years will fall each year and fall related injuries costs the NHS around £2.3 billion annually.[37] Poor sleep quality was associated with leg pain and this may contribute to self-reported exhausted which features in the Fried Frailty Model.[35].

Incontinence was the final adverse health state associated with back and leg pain. An association with BP has been reported previously.[38] Incontinence is a common precipitant to care home

admission so can affect an older person's ability to maintain their indepdendence.[39] There are many causes of incontinence in older adults but pain can affect pelvic muscle function and inability to mobilise safely to the toilet may also contribute.[40]

Implications

These findings highlight the impact of BP and leg pain in older age and their association with adverse health states which are a growing problem with an ageing population.[41] Back and leg pain are potentially modifiable symptoms that could be targeted to reduce adverse health states in older adults. Treatments for back and leg pain are effective for some people but more effective treatments are needed. Current treatments predominantly focus on symptom reduction but it is possible that treatments which also target the broader impact of ageing and focus on addressing frailty, declining mobility and falls alongside symptomatic treatments will be of greater benefit to older adults. We would also suggest that measuring age-related adverse outcomes in trials of treatments would also increase understanding of the impact of current treatments on these important health outcomes for older outcomes.

Strengths and potential limitations

The strength of this study is the large sample size with a small amount of missing data. We used multiple imputation to minimize selection bias and to increase precision.[30] We have also compared the OPAL cohort to other community-based cohorts to assess representativeness to the general population. This included the English Longitudinal Study of Ageing cohort and our cohort is broadly similar in regards to sex, age and work status.[42]

A limitation of the study is that it is a cross-sectional analysis so we cannot conclude causality. Future longitudinal analysis of the OPAL cohort data is planned to better understand causality. Data collection used postal questions so we were reliant on self-report of symptoms. This may have resulted in some participants being misclassified as BP may exist alongside other conditions such as vascular claudication which have a similar symptom presentation. This study also focused on the clinical

syndrome of neurogenic claudication rather than a diagnosis of spinal stenosis based on radiological evidence so the prevalence of anatomical spinal stenosis is unknown in the cohort. We used a self-reported measure of frailty which may over estimate frailty compared to using physical performance measures[43] but the prevalence of frailty in this study was similar to other cohorts using a measure of self-report.[44] We also collected limited data related to psychosocial factors that are known to influence pain and disability. The Tilberg Frailty Indicator does include questions on anxiety, depression, ability to cope, social support and loneliness. However, we did not use construct specific questionnaires to measure these constructs and we did not measure constructs such catastrophising or fear avoidance. We have not investigated the influence of these psychosocial factors on the relationship between NC and adverse health outcomes for older people. Finally, the proportion of participants reporting cognitive impairment was low so these findings may under represent those living in the community with severe cognitive impairment.

Conclusion

Back and leg pain is a common problem for older community-dwelling adults and associated with reduced quality of life and adverse health states including frailty, falls and mobility decline. Participants with NC were particularly affected suggesting that developing more effective treatments for older adults with NC is of upmost importance and have the potential to impact on broader health outcomes.

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Table 1. Characteristics of the cohort according to back pain groups

Characteristics	Overall (N=5,304)	No BP (n=2,483)	Back pain groups		
			BP only (n=1,786)	BP + non-NC leg pain (n=441)	BP + NC (n=594)
Age (years), mean (SD)	74.9 (6.8)	74.8 (6.8)	74.7 (6.6)	74.4 (6.6)	76.2 (7.2)
Sex, n (%)					
Male	2,584 (48.7)	1,329 (53.5)	816 (45.7)	185 (41.9)	254 (42.8)
Female	2,720 (51.3)	1,154 (46.5)	970 (54.3)	256 (58.1)	340 (57.2)
Education, n (%)					
Higher education	1,889 (35.6)	922 (37.1)	657 (36.8)	130 (29.5)	180 (30.3)
Secondary	2,990 (56.4)	1,392 (56.1)	1,004 (56.2)	258 (58.5)	336 (56.6)
None or primary	393 (7.4)	159 (6.4)	117 (6.6)	44 (10.0)	73 (12.3)
Occupational physical demands, n (%)					
Light	1,429 (26.9)	719 (29.0)	487 (27.3)	108 (24.5)	115 (19.4)
Moderate	2,481 (46.8)	1,181 (47.6)	857 (48.0)	195 (44.2)	248 (41.8)
Strenuous	1,354 (25.5)	568 (22.9)	429 (24.0)	132 (29.9)	225 (37.9)
IMD category, n (%)					
C1 – Most affluent	2,980 (56.2)	1,417 (57.1)	1,053 (59.0)	217 (49.2)	293 (49.3)
C2	1,512 (28.5)	712 (28.7)	491 (27.5)	139 (31.5)	170 (28.6)
C3	436 (8.2)	217 (8.7)	121 (6.8)	40 (9.1)	58 (9.8)
C4 – Most deprived	376 (7.1)	137 (5.5)	121 (6.8)	45 (10.2)	73 (12.3)
BMI, mean (SD)	26.6 (4.9)	26.2 (4.6)	26.4 (4.7)	27.2 (5.1)	28.5 (5.8)
Smoking, n (%)					
Never	2,640 (49.8)	1,288 (51.9)	880 (49.3)	199 (45.1)	273 (46.0)
Ex-/Current	2,649 (49.9)	1,193 (48.1)	900 (50.4)	239 (54.2)	317 (53.4)
Multisite pain (0-7), median (IQR)	2 (1-3)	1 (0-2)	2 (1-3)	3 (1-4)	3 (2-5)
Comorbidities (0-11), median (IQR)	2 (1-2)	1 (1-2)	2 (1-2)	2 (1-3)	2 (1-3)
Reduced cognitive function, n (%)	760 (14.3)	349 (14.1)	224 (12.5)	88 (20.0)	99 (16.7)
EQ-5D crosswalk index value, mean (SD)	0.77 (0.20)	0.85 (0.16)	0.76 (0.18)	0.65 (0.25)	0.59 (0.23)
Adverse health states					
Poor sleep quality, n (%)	1,035 (19.5)	327 (13.2)	340 (19.0)	150 (34.0)	218 (36.7)
Urinary incontinent, n (%)	534 (10.1)	168 (6.8)	177 (9.9)	73 (16.6)	116 (19.5)
Confidence to walk (1-10)‡, median (IQR)	1 (1-3)	1 (1-1)	1 (1-3)	1 (1-6)	5 (1-9)
Mobility decline over the last year, n (%)	1,350 (25.5)	431 (17.4)	425 (23.8)	159 (36.1)	335 (56.4)
Fall in the last year, n (%)	1,534 (28.9)	562 (22.6)	520 (29.1)	177 (40.1)	275 (46.3)
Frail, n (%)	1,433 (27.0)	387 (15.6)	487 (27.3)	198 (44.9)	361 (60.8)

Number of adverse health states (0-6), median (IQR)[#]	1 (0-2)	0 (0-1)	1 (0-2)	2 (0-3)	2 (1-4)
Number of adverse health states, n (%)					
None	2,209 (41.7)	1,317 (53.0)	706 (39.5)	110 (24.9)	76 (12.8)
One	1,276 (24.1)	599 (24.1)	475 (26.6)	94 (21.3)	108 (18.2)
2 or more	1,661 (31.3)	503 (20.3)	559 (31.3)	212 (48.1)	387 (65.2)

NC=neurogenic claudication; IMD=Index of Multiple Deprivation; BMI=body mass index; IQR= Interquartile range; SD=Standard Deviation;[‡]Scores were inverted, therefore, higher score is worse outcome; [#]participants rating their confidence to walk at 9-10/10 were categorised as having low walking confidence.

Table 2. Symptom presentation amongst participants with back pain

Back pain symptoms	All participants with back pain (N=2,821)	Back pain groups		
		BP only (n=1,786)	BP + non-NC leg pain (n=441)	BP + NC (n=594)
Age at onset of BP, n (%)				
≤40 years old	886 (31.4)	571 (32.0)	144 (32.7)	171 (28.8)
41-64 years old	1,035 (36.7)	644 (36.1)	163 (37.0)	228 (38.4)
65-74 years old	567 (20.1)	360 (20.2)	90 (20.4)	117 (19.7)
75+ years old	300 (10.6)	191 (10.7)	40 (9.1)	69 (11.6)
BP frequency, n (%)				
Rarely/few days	821 (29.1)	702 (39.3)	69 (15.7)	50 (8.4)
Some days	748 (26.5)	494 (27.7)	140 (31.8)	114 (19.2)
Most days/Every day	1,216 (43.1)	567 (31.8)	227 (51.5)	422 (71.0)
BP Troublesome (intensity), n (%)				
Not at all/Slightly	1,456 (51.6)	1,140 (63.8)	180 (40.8)	136 (22.9)
Moderate	897 (31.8)	493 (27.6)	160 (36.3)	244 (41.1)
Very or extreme	449 (15.9)	145 (8.1)	97 (22.0)	207 (34.9)
BP pattern since onset, n (%)				
Getting better	86 (3.1)	66 (3.7)	11 (2.5)	9 (1.5)
Getting worse	255 (9.0)	70 (3.9)	50 (11.3)	135 (22.7)
Fairly constant	619 (21.9)	293 (16.4)	126 (28.6)	200 (33.7)
Comes and goes over time	1,832 (64.9)	1,338 (74.9)	249 (56.5)	245 (41.3)

BP=Back pain; NC=neurogenic claudication

Table 3. Cross-sectional association between back and leg pain and adverse health states compared to no back pain.

Age related adverse health outcomes	Poor Sleep Quality	Urinary Incontinence	Confidence to walk‡	Mobility decline	Falls in previous year	Frail
	RR (95%CI)	RR (95%CI)	RR (95%CI)	RR (95%CI)	RR (95%CI)	RR (95%CI)
No BP	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
BP only	1.17 (1.02-1.35)	1.17 (0.95-1.43)	1.23 (1.06-1.43)	1.13 (1.00-1.26)	1.14 (1.03-1.26)	1.38 (1.24-1.54)
BP + non-NC leg pain	1.68 (1.41-1.99)	1.59 (1.22-2.07)	1.89 (1.52-2.36)	1.42 (1.22-1.64)	1.40 (1.22-1.61)	1.77 (1.55-2.02)
BP + NC	1.67 (1.42-1.97)	1.43 (1.12-1.83)	3.11 (2.56-3.78)	1.74 (1.54-1.97)	1.42 (1.25-1.61)	1.88 (1.67-2.11)

Each regression model was adjusted for demographic (age, sex, occupational physical demands, education and are deprivation), lifestyle factors (body mass index and smoking status), comorbidities and multi-site pain. Multiple imputation was performed. Ten completed datasets were generated.

RR=Relative Risk; BP=back pain; NC=neurogenic claudication; RR=Relative Risk; CI=confidence interval

‡ Range: 1 to 10 where higher score means lower level of confidence walking.

Figure Legends

Figure 1. Prevalence of back pain with and without leg pain by age groups