Association between pain and sexual health in older people: results from the English Longitudinal Study of Ageing

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Abstract

There is little information on the impact of pain on sexual health in later life. The aim of this analysis was to determine the association between self-reported pain and sexual health in older men and women.

Data were collected for the nationally representative English Longitudinal Study of Ageing. Community-dwelling adults aged 50 years and older completed the Sexual Relationships and Activities questionnaire in wave 6 (2012/2013). Participants were asked (waves 1 to 6 [2002-2013]) if they were "often troubled with pain" and, how severe was their pain; mild, moderate or severe. The association between pain and sexual health was assessed using logistic regression. Analyses were stratified by gender, with adjustments made for age followed by adjustments for health and lifestyle factors, depressive symptoms and socioeconomic status.

Of the 3,916 participants who reported having sexual activity in the past year, 28% of women and 23% of men reported experiencing moderate or severe pain often at wave 6. After adjusting for age, compared to men experiencing no pain, men with moderate or severe pain reported less frequent intercourse and masturbation, more erectile difficulties, and more concerns about their sexual health. After age adjustment there were no associations between pain severity and sexual health among women. Of the 1,872 participants with a cumulative pain score, there were significant associations between reporting pain and concerns about sexual health in both men and women.

Pain was associated with impairment in sexual health in men and women though the effect was more marked in men.

Introduction

The frequency of sexual activity generally declines with increasing age, however, a sizeable minority of men and women remain sexually active well into their 80s and 90s and regard sexuality as an important part of life [11]. There is some evidence that sexual dysfunction is more strongly related to physical health than chronological age [7]. In a recent cohort study of men and women aged 50 years and older (N= 6,201), poorer general health was associated with poorer sexual health, including lower levels of sexual activity and a higher prevalence of problems with sexual functioning, particularly in men [6]. Chronic pain has been reported to have detrimental effects on sexual function and patients with chronic pain have greater sexual difficulties compared with pain-free controls [9]. Most research, however, has focused on patients either attending chronic pain clinics or with specific medical disorders. The extent to which pain impacts on sexual health in the general population remains largely unknown. Using data collected from the English Longitudinal Study of Ageing (ELSA), a nationally representative survey of community-dwelling men and women aged 50 years and older in England, we examined the cross-sectional association between pain and sexual health.

Methods

Study Design

Details regarding subject recruitment and study design have been described previously [17]. Briefly, men and women aged 50 years or older living in private households in England contributed data to ELSA. Data collection has taken place every two years following wave 1 (2002/2003) through a combination of face-to-face interviews and self-completed questionnaires. For the purpose of this analysis, data collected at wave 6 (2012/2013) was used as this was the first wave in which the Sexual Relationships and Activities Questionnaire (SRA-Q) was incorporated into the study. A total of 10,601 participants took part in wave 6, and 7,079 (67%) completed the SRA-Q. The analysis in the current study was limited to nationally representative, core ELSA participants, aged 50 years or older (4,400 participants were dropped, leaving data available on 6,201). As we were primarily interested in examining the association between pain and sexual health we additionally restricted this analysis to those reporting ‘any’ sexual activity in the past 12 months (2,251 participants reported no sexual activity in the previous 12 months and 34 participants did not answer the

question) leaving 2,080 men and 1,836 women (total n=3,916; 55% of those who completed the SRA-Q in wave 6) in the final sample. We looked also at the relationship between previous pain experience over the past 10 years and sexual health using a subgroup of 1,872 participants who had i) information about the occurrence of pain during waves 1 to 6 and, ii) who completed the SRA-Q and, iii) reported having sexual activity in the past 12 months at wave 6. Ethical approval for ELSA was granted from the National Research and Ethics Committee and all participants provided informed consent.

Assessments

Sexual Health

The SRA-Q covers various domains of sexual health, including questions on sexual activities, sexual difficulties and concerns with sexual functioning. The items making up the SRA-Q were taken from validated instruments [12],[13],[21], modified to ensure gender specificity and chosen to partly harmonise with the US National Social Life, Health and Aging Study [18] and the third UK National Survey of Sexual Attitudes and Lifestyles [10]. Face validity of the ELSA SRA-Q was evaluated among a subsample (n=45) of the ELSA pilot panel by trained interviewers under the guidance of NatCen Social Research. The SRA-Q has been used in previous analyses assessing sexual health in ELSA and has been found to be associated with well-being [6] and detrimental to the couple relationship [4]; providing further evidence of its validity. The items taken from the SRA-Q for this analysis and their response sets, including the gender specific questions, are presented in Table 1. Participants completed the SRA-Q privately and all questionnaires were sealed upon completion in an envelope. The male and female versions of the SRA-Q are freely available online at: http://www.elsa-project.ac.uk.

Pain

Two items adopted from the US Health and Retirement Study were used to measure pain in each wave of ELSA. These items have been used in previous analyses assessing pain in ELSA [2],[20]. Participants were asked at each wave of ELSA if they were “often troubled by pain” and if so, they were asked “how bad is the pain most of the time? Is it… mild, moderate, or, severe” on a 3-point scale. Summary variables were created representing severity and frequency of pain. Participants were categorised by pain severity in wave 6 as

those who experienced no pain, mild pain often and moderate/severe pain often. A 'cumulative' pain score was defined based on the number of times a person reported pain in waves 1 to 6. This was then categorised as: no pain in any wave of ELSA (n= 642; 34.7%), any pain in 1 or 2 waves (n= 552, 29.8%), 3 or 4 waves (n=314, 16.9%) and 5 or 6 waves (n=344, 18.6%). With two years between each wave of data collection, the cumulative pain scale covered 10 years. There was missing data on cumulative pain for 20 of the participants.

Other assessments

Participants were asked to provide information regarding their marital status and a summary variable was created categorising subjects as married/cohabiting, single (never married), divorced/ separated, or widowed. Depressive symptoms were assessed using the short form version of the Centre of Epidemiological Studies Depression (CES-D, 8-item) scale. A score of four or more was used to define cases of elevated depressive symptoms [16]. Smoking status was determined by asking participants if they smoke cigarettes at all nowadays (at wave 6) with responses recorded as yes or no. Information was gathered regarding the typical frequency of alcohol consumption over the past year and results were coded to represent those who never or rarely (never - once or twice per year), regularly (once every two months - twice a week), or very frequently (three days a week - almost every day) drank alcohol. The age at which participants left full-time education was recorded as an indicator of socioeconomic status, with responses coded as 14 years or younger, 15-18 years old and at the age of 19 years or older. To assess overall health status, participants were asked whether a doctor had ever told them they had any of a range of common conditions including; arthritis, asthma, cardiovascular diseases, hypertension, and diabetes. Responses were then summed to give a count of how many comorbidities they had and were categorised as none, one, two, or three or more.

Statistical methods

Descriptive statistics were used to provide a summary of participant characteristics and the frequency of responses to the SRA-Q by gender. Logistic regression was used to examine the association between i) the sexual health variables (which were dichotomised, see Table 1) and pain severity (defined as none, mild or moderate / severe) at wave 6, and ii) sexual health variables and the number of times that subject reported pain in waves 1 to 6 (none, 1-2

times, 3-4 times or more than 4 times), with the results expressed as odds ratios (OR) and 95% confidence intervals (CI). The analyses were undertaken separately in men and women. In the first instance for both analyses, adjustments were made for age at wave 6 (model 1), before further adjustments were made for smoking status, depressive symptoms, partner status, age at which participants left education and the number of comorbidities reported at wave 6 (model 2). These were included as they have been associated with reporting of pain / sexual activity in previous studies [5, 6]. Sampling weights were used to correct for differential non-response, including to the SRA-Q and for sampling probabilities, and to calibrate back to the 2011 Census population distributions for sex and age (full details are available from http://www.elsa-project.ac.uk). All analyses were conducted using STATA SE v13.1 (StataCorp, College Station, TX).

Results

Participant characteristics

3,196 subjects who reported sexual activity in the past 12 months and with data concerning pain were included in the analysis. Of these 2,373 participants reported no pain, 550 mild pain often and 991 moderate or severe pain (2 subjects did not complete the question). Of those who were not sexually active 1,166 participants reported no pain, 254 reported mild pain often and 829 reported moderate or severe pain often. Table 2 summarises the demographic and health characteristics of the analysis sample, the data presented are weighted to calibrate to the 2011 census (providing more accurate population estimates) and because of this no formal statistical tests were undertaken (if the 95% CIs don't overlap it is likely that the proportions are significantly different). For the 3,916 participants providing data on sexual health and pain severity the mean (SD) age was 64.8 (7.9) years for men and 63.4 (7.4) years for women at wave 6. A greater proportion of men reported that they consumed alcohol more frequently (24.4% vs 18.6% reported consuming alcohol 3 or more days a week) than women. A greater proportion of women reported experiencing depressive symptoms (13.2% vs 9.6%) in comparison with men and reported moderate / severe pain more frequently (28.5% vs 22.6%). Similar gender differences were found in those 1,872 with complete cumulative pain data. A greater proportion of women reported any pain in 3 or 4 waves than men (20.9% vs 15.3%) and in 5-6 waves (22.7% vs 17.2%).

Frequency of SRA-Q responses

Compared to women, a greater proportion of men reported frequent sexual desire (92.9% vs. 72.7%) and masturbation (44.3% vs 15.9%) (Table 3). Compared to women, a greater proportion of men reported experiencing concern about their sexual desire (15.2% vs 10.7%), concern regarding sexual activity (13.3% vs 7.7%) and concern about orgasmic experience (10.8% vs 7.0%). A greater proportion of men also reported being concerned with their overall sex life (18.8% vs 13.1%). Sexual activity was found to decrease with age; however, no evidence was found of any significant age/pain interaction for any of the observed associations reported. As with the baseline characteristics as the data presented are weighted percentages we did not undertake any statistical analyses of these differences.

Pain and sexual activities

Table 4 shows the results of the logistic regressions assessing pain severity by gender for those reporting pain and its severity in wave 6 and cumulative pain. In analyses assessing the association between pain severity and sexual activities, after adjusting for age (model 1), compared to men experiencing no pain, men reporting moderate or severe pain were significantly less likely to report frequent intercourse (OR 0.70; 95% CI 0.53, 0.92). This association was no longer significant after adjusting further for smoking status, depressive symptoms, partner status, age left education and number of comorbidities (model 2). Pain severity was not found to be significantly associated with intercourse frequency in women. After adjusting for age (model 1), compared to men without pain, men experiencing moderate or severe pain were less likely to engage in frequent masturbation (OR 0.75; 95% CI 0.57, 0.99); this association remained significant after further adjustments (model 2). No association between pain severity and masturbation was observed in women. In women, compared to those with no pain, those with mild (OR 1.46; 95% CI 1.00, 2.15) or moderate/severe pain (OR 1.36; 95% CI 1.00, 1.85) had an increase in sexual desire in the fully adjusted (model 2) though not age adjusted model.

After adjusting for age (model 1, Table 4), compared to men reporting no pain at any wave, men reporting any pain in 3 or 4 waves were significantly less likely to report frequent intercourse (OR 0.55; 95% CI 0.35, 0.86). This association remained significant after further adjustment (model 2). Compared to women reporting no pain at any wave, after adjusting for age, women reporting any pain in 1 or 2 waves were significantly less likely to report

frequent intercourse (OR 0.66; 95% CI 0.45, 0.95) with the association remaining significant after further adjustment (model 2).

Pain and sexual difficulties

In men, in comparison to those who were pain free, after adjustment for age, moderate or severe pain was found to be associated with an increased risk of erectile difficulties (OR 1.68; 95% CI 1.27, 2.21) (model 1, Table 5). This association was no longer significant after further adjustments were made (model 2). Pain severity was not significantly associated with any reported sexual difficulties in women.

In men, in comparison to those with no pain at any wave, and after age adjustment, those reporting pain in 1 or 2 waves (OR 1.46; 95% CI 1.04, 2.07) and 5 or 6 waves (OR 1.70; 95% CI 1.12, 2.58) had significantly increased risk of reporting erectile difficulties (Table 5). The association became non-significant after further adjustment. In women, after age adjustment, compared to those reporting no pain, those reporting pain in 3 or 4 waves (OR 2.31; 95% CI 1.13, 4.70) and in 5 or 6 waves (OR 2.17; 95% CI 1.04, 4.52) had significantly increased risk of reporting pain during sexual activities, though the association was not significant after further adjustment (model 2).

Pain and sexual concerns

Pain severity appeared to have an effect on sexual concerns in men. After adjusting for age (model 1, Table 6), compared to men reporting no pain, those reporting moderate or severe pain were found to be more concerned about their sexual desire (OR 1.68; 95% CI 1.19, 2.36) and orgasms (OR 1.73; 95% CI 1.18, 2.52). These associations, however, became nonsignificant after further adjustments (model 2). Compared to men reporting no pain, after adjustment for age, men with moderate or severe pain were more concerned about the frequency of their sexual activities (OR 1.87; 95% CI 1.33, 2.63), erections (OR 2.00; 95% CI 1.46, 2.74) and overall concern about their sex life (OR 2.07; 95% CI 1.54, 2.78). These associations were attenuated though remained significant after further adjustment (model 2). No significant associations were found between pain and sexual concerns in women.

Stronger associations were observed between the cumulative pain score and sexual health concerns in both men and women. After adjusting for age (model 1, Table 6), compared to men reporting no pain at any wave, those reporting pain in 1 or 2 waves (OR 1.71; 95% CI 1.06, 2.77) and those reporting pain in 5 or 6 waves (OR 1.83; 95% CI 1.07, 3.14) were

found to have concerns about their sexual desire. Compared to women reporting no pain at any wave, those reporting pain in 5 or 6 waves were found to be more concerned about their sexual desire (OR=2.55; 95% CI 1.22, 5.35) and activity (OR=3.45; 95% CI 1.54, 7.72), and those reporting pain in 3 or 4 waves more concerned about their arousal (OR=3.16; 95% CI 1.00, 9.96). These associations were, however, no longer significant after further adjustment (model 2). Those reporting pain at in 5 or 6 wave were also more concerned about orgasm (OR=3.23; 95% CI 1.20, 8.74) an association which persisted after further adjustment. Compared to men reporting no pain at any wave, men reporting pain in 1 or 2, 3 or 4 and 5 or 6 waves were found to be more concerned about the frequency of their sexual activities. This was true for both the age adjusted and fully adjusted models. In comparison to women who did not report pain, those reporting pain in 5 or 6 waves were more likely to be concerned about their ability to orgasm (both model 1 and model 2). In comparison to men who did not report pain (all waves) had a significantly greater concern about erection and this persisted in those who reported pain in 3 or 4 and 5 or 6 waves after adjustment. In comparison with men who did not report pain at any wave, men who reported pain in 3 or 4 waves (OR 1.85; 95% CI 1.11, 3.09) and 5 or 6 waves (OR 2.47; 95% CI 1.56, 3.90) had significantly higher overall concern regarding their sexual health in model 1, with the latter remaining significant in model 2. In comparison with women who reported no pain, after adjustment for age, those reporting pain in 5 or 6 waves were also found to have higher overall concern regarding their sex life (OR 2.50; 95% CI 1.33, 4.73).

Discussion

To the authors knowledge this is the first population-based study to explore the association between the occurrence of pain and sexual health in both older men and women. The results indicate that after adjusting for age, compared to pain free men, those reporting moderate or severe pain were significantly less likely to report frequent sexual intercourse, were less likely to engage in frequent masturbation, were more concerned about their sexual desires, sexual activities and their ability to have an erection and experienced more erectile difficulties. However, many of the associations found between pain at wave 6 and sexual health in men were explained by other health and lifestyle factors. In contrast, we did not observe that self-reported pain severity had an important effect on sexual health in women.

The analysis assessing the impact of pain over cumulative waves was conducted to provide further information to help shed light on the results of the first analysis; the data on pain at wave 6 provides information about recent pain while the cumulative pain provides information about the recurrence or chronicity of the pain. The cumulative data may not include subjects with pain at wave 6; however, recurrent / chronic pain may impact on sexual health not just at the time of the pain but also in the future. Broadly similar associations were found in men when looking at a cumulative pain score over a 10-year period; although unlike pain severity, in comparison to those reporting no pain, more frequent pain reporting during previous study waves was found to be associated with sexual concerns in both men and women.

Our results are consistent with findings, at least in relation to men, from a cross-sectional analysis by Tajar and colleagues using data collected from 3,206 men (mean age 60 years old) who participated in the population based European Male Ageing Study (EMAS) [19]. In EMAS, pain was associated with higher sexual functioning-related distress scores after adjustments were made for putative confounding factors. In addition, men reporting some pain in EMAS (defined as reporting pain though that did not satisfy the American College of Rheumatology's criteria for chronic widespread pain) had poorer overall sexual functioning, though the association was confounded by the effects of age, depression and alcohol intake. Our data are less consistent with previous studies utilising data collected from clinic patients (with fibromyalgia syndrome [14], chronic prostatitis/chronic pelvic pain [15] and rheumatoid arthritis [1]) indicating that chronic pain has a detrimental effect on sexual activity in both men and women. That these clinic based studies observed stronger relationships between pain and sexual activity may be due in part to differences in the subjects studied, including patients with diagnosed pain syndromes associated with rheumatoid arthritis, fibromyalgia and other musculoskeletal disorders, which may themselves impact independently on sexual health.

Many of the significant associations found after age adjustment among men in the current study became non-significant after adjustments for putative confounding factors were made. This is consistent with previous research showing the link between pain and sexual functioning can be largely explained by psychological factors, mainly depression [19],[5].

Our results are also consistent with previous findings that pain impacts more on men's sexual

health than women's. Lee and colleagues [6] reported that sexually active men had higher levels of concern regarding their sexual health than women at all ages though why self-reported pain severity has more of a negative impact on the sexual health of men than on women remains poorly understood. Previous studies have shown that chronic diseases and physical health problems have more of an impact on men's sexual function than women's [3], [8], and that a commonly reported reason for both men and women's lack of sexual activity is the poor health of the male partner24.

There were some differences in the significance of effects in the analysis of pain severity and the cumulative pain score. For sexual concerns the effects appeared to be more marked for the cumulative pain score rather than pain severity reflecting perhaps the impact of more persistent / recurrent pain on the psychological aspects of sexual health. There did not appear to be any important difference for the sexual activities / difficulties variables.

The current study has a number of strengths including the large, nationally representative community-based cohort spanning the ages of 50 years and older, however there are certain limitations that need to be considered. The finding that women with pain in wave 6 were more likely to experience an increase in sexual desire compared to women without pain is an unexpected finding ; this was only observed in the adjusted analysis and there were no other significant associations suggesting a beneficial effect of pain on any of the other sexual health variables and it is possible that this may be a type 2 error. The cohort comprised of community dwelling, predominantly Caucasian older adults, and caution is needed when extrapolating findings beyond this group. The pain variable captured in ELSA did not specify a particular time window. However, asking whether participants were "often troubled by pain" is likely to have excluded those suffering from acute pain though we cannot be certain of this. The pain measure was also self-reported and therefore subject to errors of recall. Any such misclassification of pain would tend though to result in an attenuation of any observed associations. The cross-sectional design of the study does not allow for the examination of the temporal relationship between pain and sexual health; it seems unlikely though that poorer sexual health would result in the occurrence of pain. It is possible that participants who did not complete the SRA-Q may have differed from those that did complete it; they may have had pre-existing sexual problems or felt that they have "retired" from sex. To account for this we included non-response weights in the analysis; by weighting for nonresponse

to the SRA-Q, we account for the variation in response according to demographic and health characteristics. However, these weights will not have accounted for any sexual health characteristics that were unrelated to the factors used for weighting, and it is possible, therefore, our data may overestimate the prevalence of sexual activities and potentially underestimate the prevalence of sexual problems.

In conclusion, pain is associated with impairment in sexual health in men and women though the effect appears to be more marked in men, and stronger for sexual concerns than sexual function and activity.

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References

[1] Abdel-Nasser AM, Ali EI. Determinants of sexual disability and dissatisfaction in female patients with rheumatoid arthritis. Clin. Rheumatol. 2006;25:822–830.

[2] Chou K-L. Reciprocal relationship between pain and depression in older adults: evidence from the English Longitudinal Study of Ageing. J. Affect. Disord. 2007;102:115–123.

[3] Field N, Mercer CH, Sonnenberg P, Tanton C, Clifton S, Mitchell KR, Erens B,

Macdowall W, Wu F, Datta J, Jones KG, Stevens A, Prah P, Copas AJ, Phelps A, Wellings K, Johnson AM. Associations between health and sexual lifestyles in Britain: Findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). Lancet 2013;382:1830–1844.

[4] Hinchliff S, Tetley J, Lee D, Nazroo J. Older Adults' Experiences of Sexual Difficulties: Qualitative Findings From the English Longitudinal Study on Ageing (ELSA). J. Sex Res. 2017:1–12.

[5] Kwan KSH, Roberts LJ, Swalm DM. Sexual dysfunction and chronic pain: the role of psychological variables and impact on quality of life. Eur. J. Pain 2005;9:643–652.

[6] Lee DM, Nazroo J, O'Connor DB, Blake M, Pendleton N. Sexual Health and Wellbeing Among Older Men and Women in England: Findings from the English Longitudinal Study of Ageing. Arch. Sex. Behav. 2016;45:133–144.

[7] Lewis RW, Fugl-Meyer KS, Corona G, Hayes RD, Laumann EO, Moreira ED, Rellini AH, Segraves T. Definitions/epidemiology/risk factors for sexual dysfunction. J. Sex. Med. 2010;7:1598–607.

[8] Lindau ST, Schumm LP, Laumann EO, Levinson W, O 'Muircheartaigh CA, Waite LJ. A Study of Sexuality and Health among Older Adults in the United States. N Engl J Med. 2007 2007;357:762–774.

[9] Maruta T, Osborne D, Swanson DW, Haling JM. Chronic pain patients and spouses: marital and sexual adjustment. Mayo Clin. Proc. 1981;56:307–310.

[10] Mercer CH, Wellings K JA. What's new about Natsal-3? Sex. Transm. Infect. 2013.

[11] Mitchell KR, Mercer CH, Ploubidis GB, Jones KG, Datta J, Field N, Copas AJ, Tanton C, Erens B, Sonnenberg P, Clifton S, Macdowall W, Phelps A, Johnson AM, Wellings K. Sexual function in Britain: Findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). Lancet 2013;382:1817–1829.

[12] Mitchell KR, Ploubidis GB, Datta J, Wellings K. The Natsal-SF: A validated measure of sexual function for use in community surveys. Eur. J. Epidemiol. 2012;27:409–418.

[13] O'Connor DB, Corona G, Forti G, Tajar A, Lee DM, Finn JD, Bartfai G, Boonen S, Casanueva FF, Giwercman A, Huhtaniemi IT, Kula K, O'Neill TW, Pendleton N, Punab M, Silman AJ, Vanderschueren D, Wu FC. Assessment of sexual health in aging men in Europe: development and validation of the European Male Ageing Study

sexual function questionnaire. J Sex Med 2008;5:1374–1385.
[14] Shaver JLF, Wilbur J, Robinson FP, Wang E, Buntin MS. Women's health issues with fibromyalgia syndrome. J. Womens. Health (Larchmt). 2006;15:1035–1045.
[15] Smith KB, Pukall CF, Tripp DA, Nickel JC. Sexual and relationship functioning in men with chronic prostatitis/chronic pelvic pain syndrome and their partners. Arch. Sex. Behav. 2007;36:301–311.
[16] Steffick DE. Documentation of affective functioning measures in the health and retirement study. Ann Arbor, MI: HRS Health Working Group, 2000.
[17] Steptoe A, Breeze E, Banks J, Nazroo J. Cohort Profile: The English Longitudinal Study of Ageing. Int. J. Epidemiol. 2012:1–9.
[18] Suzman R. The National Social Life, Health, and Aging Project: An Introduction. J. Gerontol. Soc. Sci. 2009:64–5.
[19] Tajar A, O'Neill TW, Lee DM, O'Connor DB, Corona G, Finn JD, Bartfai G, Boonen S, Casanueva FF, Forti G, Giwercman A, Han TS, Huhtaniemi IT, Kula K, Lean MEJ, Pendleton N, Punab M, Purandare N, Silman AJ, Vanderschueren D, Wu FCW, McBeth J, Petrone L, Borghs H, Slowikowska-Hilczer J, Walczak-Jedrzejowska R, Steer P, Pye S, Lage M, Földesi I, Fejes I, Korrovitz P, Jiang M. The effect of musculoskeletal pain on sexual function in middle-aged and elderly European men: Results from the European male ageing study. J. Rheumatol. 2011;38:370–377.
[20] Wade KF, Marshall A, Vanhoutte B, Wu FCW, O'Neill TW LD. Does Pain Predict Frailty in Older Men and Women? Findings From the English Longitudinal Study of Ageing (ELSA). J Gerontol A Biol Sci Med Sci 2016.
[21] Waite LJ, Laumann EO, Das A, Schumm LP. Sexuality: measures of partnerships, practices, attitudes, and problems in the National Social Life, Health, and Aging Study. J Gerontol B Psychol Sci Soc Sci 2009;64 Suppl 1:i56–66.

Summary: Pain was associated with impairment in sexual health and mainly linked to elevated sexual concerns. The effect was more marked in men than women.

Table 1 Sexual Relationships and Activities questionnaire items

Topic	Response set
Sexual behaviour and activities (…during the past month)	
How often did you think about sex? How many times have you had or attempted sexual intercourse (vaginal, anal, or oral)? How frequently did you engage in other sexual activities (kissing, petting, or fondling)? How often did you masturbate?	7-point scale: 'not at all' to 'more than once a day'. Those answering 2-3 times a month or more were classified as participating frequently in that particular sexual behavior or activity.
Sexual functioning (…during the past month)	
Are you able to get or keep an erection, which would be good enough for sexual activity? [men]	4-point scale: 'always able' to 'never able'. Men answering never able to or sometimes able were classified as having current erectile difficulties.
How often did you feel sexually aroused during sexual activity? [women] How often did you have an uncomfortably dry vagina during sexual activity? [women] How often did you experience pain or discomfort during/after sexual activity? [women]	5-point scale: 'never' to 'always'. Sexual arousal: women answering never or much less than1/2 the time were classified as having difficulty becoming aroused. Dry vagina/pain: women answering much more than ½ the time or always were classified as having difficulty with dry vagina or pain.
Changes in sexual behaviour and function (…compared with a year ago)	
Have you been worried or concerned by your level of sexual desire? Have you been worried or concerned by the frequency of your sexual activities? Are you worried or concerned by your current ability to become sexually aroused? [women[Have you been worried or concerned by your ability to have an erection? [men] Have you been worried or concerned by your orgasmic experience? How worried or concerned have you been about your overall sex life?	5-point scale: 'not at all worried or concerned' to 'extremely worried or concerned'. Those answering moderately, very or extremely worried or concerned were classified as being concerned about that particular sexual behavior or activity.

Table 2 Characteristics of subjects who reported any sexual activity in the past year

Variable	Pain status at wave 6		Cumulative pain waves 1-6	
	Men N= 2080*	Women N= 1836*	Men N= 1002*	Women N= 870*
	Mean (SD)			
Age	64.8 (7.9)	63.4 (7.4)	68.9 (6.6)	67.6 (6.1)
	% (95% CI)			
Current partnership status				
Married/cohabiting	75.7 (73.3, 78.1)	77.1 (74.8, 79.4)	80.8 (78.1, 83.5)	79.7 (77.0, 82.5)
Never married	8.6 (6.9, 10.2)	4.6 (3.4, 5.8)	4.9 (3.4, 6.4)	2.3 (1.4, 3.2)
Divorced or separated	11.8 (10.0, 13.7)	13.3 (11.4, 15.2)	8.0 (6.1, 9.9)	10.0 (8.0, 12.0)
Widowed	3.9 (3.0, 4.8)	5.0 (4.0, 6.1)	6.2 (4.7, 7.8)	8.0 (6.1, 9.9)
Smoking status				
Non smoker	85.3 (83.2, 87.4)	87.0 (85.0, 89.0)	90.6 (88.5, 92.8)	91.4 (89.3, 93.6)
Smoker	14.7 (12.6, 16.7)	13.0 (11.0, 15.0)	9.4 (7.2, 11.1)	8.5 (6.4, 10.7)
Age left education				
14 years or younger	4.6 (3.6, 5.6)	3.9 (2.8, 5.0)	8.1 (6.1, 10.1)	6.7 (4.5, 9.0)
15-18 years	68.5 (66.0, 71.0)	75.2 (72.8, 77.6)	67.3 (64.2, 70.4)	76.1 (73.0, 79.2)
19 years or older	26.9 (24.4, 29.3)	20.9 (18.7, 23.2)	24.6 (21.8, 27.4)	17.2 (14.7, 19.6)
Number of morbidities				
0	39.1 (36.4, 41.8)	40.5 (37.7, 43.2)	26.4 (23.5, 29.4)	27.3 (24.2, 30.4)
1	34.5 (32.0, 37.0)	34.8 (32.3, 37.4)	37.0 (33.8, 40.2)	37.4 (34.0, 40.8)
2	17.7 (15.8, 19.6)	16.3 (14.4, 18.3)	23.6 (20.7, 26.4)	21.7 (18.6, 24.7)
3 or more	8.7 (7.4, 10.0)	8.4 (6.9, 9.8)	13.0 (10.7, 15.3)	13.6 (10.9, 16.3)
Depression (CES-D 8 item)				
Depressive symptoms (score <4)	90.4 (88.7, 91.1)	86.8 (84.8, 88.9)	94.0 (92.1, 95.8)	90.3 (88.2, 92.4)
Depressive symptoms (score ≥4)	9.6 (7.9, 11.3)	13.2 (11.1, 15.2)	6.0 (4.2, 7.9)	9.7 (7.6, 11.8)
Alcohol consumption				
Never or rarely (never-once or twice a year)	17.5 (15.3, 19.6)	29.6 (27.0, 32.2)	15.1 (12.5, 17.6)	29.8 (26.5, 33.2)
Regularly (once every 2 months-twice a week)	58.1 (55.5, 60.7)	51.8 (49.1, 54.6)	55.7 (52.3, 59.1)	50.3 (46.7, 53.9)
Frequently (3 days a week-almost every day)	24.4 (22.3, 26.6)	18.6 (16.5, 20.6)	29.2 (26.2, 32.2)	19.9 (17.0, 22.7)
Ethnicity				
White	93.4 (91.3, 95.5)	97.2 (95.9, 98.4)	97.2 (95.7, 98.8)	98.9 (98.0, 99.8)
Non-white	6.6 (4.5, 8.7)	2.8 (1.6, 4.1)	2.8 (1.2, 4.3)	1.1 (0.2, 2.0)
Pain Status				
None	63.8 (61.3, 66.4)	56.1 (53.4, 58.8)		
Mild pain often	13.5 (11.7, 15.4)	15.4 (13.3, 17.4)		
Moderate or severe pain often	22.6 (20.4, 24.8)	28.5 (26.1, 31.0)		
Accumulative pain score				
No pain in any wave			36.6 (33.4, 39.8)	29.7 (26.5, 32.9)
Pain 1 or 2 waves			30.9 (27.9, 34.0)	26.7 (23.6, 29.8)
Pain 3 or 4 waves			15.3 (12.8, 17.7)	20.9 (17.8, 24.0)
Pain 5 or 6 waves			17.2 (14.6, 19.7)	22.7 (19.5, 25.8)

Values are weighted percentages with CIs around the estimates.

*Number of observations for each variable varies; 2,080 males and 1,836 females relate to complete age, partner status, smoking, age left education and comorbidity data.

Table 3 Frequency of self-reported sexual activities and problems, among those reporting any sexual activity in the past year.

Variable	Men	Women
	% (95% CIs)	% (95% CIs)
Sexual activities		
Frequent desire	92.9 (91.6, 94.1)	72.7 (70.4, 75.1)
Frequent intercourse	48.4 (45.8, 51.1)	50.1 (47.3, 52.8)
Frequent petting	63.6 (61.0, 66.2)	67.7 (65.2, 70.2)
Frequent masturbation	44.3 (41.6, 47.0)	15.9 (13.8, 18.0)
Sexual difficulties		
Erectile difficulties	27.9 (25.7, 30.1)	
Arousal difficulties		32.3 (29.5, 35.0)
Dry vagina during sexual activity		19.1 (16.9, 21.4)
Pain during/after sexual activity		10.1 (8.3, 11.9)
Sexual concerns		
Level of sexual desire	15.2 (13.2, 17.2)	10.7 (8.9, 12.4)
Frequency of sexual activities	13.3 (11.5, 15.1)	7.7 (6.2, 9.2)
Ability to become sexually aroused		7.4 (5.8, 9.0)
Ability to have an erection	13.9 (12.2, 15.6)	
Orgasmic experience	10.8 (9.1, 12.5)	7.0 (5.3, 8.7)
Overall sex life	18.8 (16.7, 20.8)	13.1 (11.3, 15.0)

Values are weighted percentages. *See Table 1 for response set indicating how each variable was defined

Table 4 Association of sexual activities with pain severity and cumulative pain, among those reporting any sexual activity in the past year

Sexual activities	Men		Women	
	Model 1	Model 2	Model 1	Model 2
Pain severity				
Frequent desire	N= 2071	N= 2004	N= 1818	N= 1774
Pain status				
None	Reference	Reference	Reference	Reference
Mild	0.63 (0.36, 1.11)	0.68 (0.38, 1.22)	1.30 (0.90, 1.89)	1.46 (1.00, 2.15)*
Moderate/severe	0.72 (0.47, 1.11)	0.81 (0.50, 1.32)	1.11 (0.85, 1.46)	1.36 (1.00, 1.85)*
Frequent intercourse	N= 2061	N= 1994	N= 1812	N= 1768
Pain status				
None	Reference	Reference	Reference	Reference
Mild	0.84 (0.60, 1.17)	0.93 (0.66, 1.32)	0.90 (0.65, 1.25)	0.90 (0.64, 1.26)
Moderate/severe	0.70 (0.53, 0.92)*	0.85 (0.64, 1.13)	0.88 (0.68, 1.13)	0.96 (0.72, 1.28)
Frequent petting	N= 2061	N= 1995	N= 1810	N= 1768
Pain status				
None	Reference	Reference	Reference	Reference
Mild	0.81 (0.57, 1.15)	0.87 (0.60, 1.27)	0.92 (0.66, 1.30)	0.94 (0.66, 1.35)
Moderate/severe	0.79 (0.60, 1.03)	0.92 (0.69, 1.24)	1.09 (0.84, 1.41)	1.20 (0.89, 1.60)
Frequent masturbation	N= 2059	N= 1994	N= 1803	N= 1761
Pain status				
None	Reference	Reference	Reference	Reference
Mild	0.97 (0.70, 1.36)	0.99 (0.70, 1.40)	1.36 (0.89, 2.09)	1.45 (0.92, 2.29)
Moderate/severe	0.75 (0.57, 0.99)*	0.70 (0.51, 0.95)*	0.88 (0.61, 1.26)	0.99 (0.67, 1.49)
Cumulative pain				
Frequent desire	N= 988	N= 953	N= 850	N= 831
Cumulative pain score				
No pain	Reference	Reference	Reference	Reference
Pain 1 or 2 waves	0.66 (0.38, 1.15)	0.61 (0.34, 1.10)	0.71 (0.48, 1.05)	0.69 (0.46, 1.05)
Pain 3 or 4 waves	0.55 (0.29, 1.03)	0.63 (0.32, 1.26)	0.98 (0.62, 1.55)	0.93 (0.57, 1.51)
Pain 5 or 6 waves	0.82 (0.42, 1.64)	1.08 (0.51, 2.26)	0.81 (0.52, 1.25)	0.92 (0.56, 1.52)
Frequent intercourse	N= 984	N= 949	N= 850	N= 831
Cumulative pain score				
No pain	Reference	Reference	Reference	Reference
Pain 1 or 2 waves	0.80 (0.57, 1.12)	0.80 (0.57, 1.13)	0.66 (0.45, 0.95)*	0.67 (0.45, 0.99)*
Pain 3 or 4 waves	0.55 (0.35, 0.86)*	0.57 (0.36, 0.91)*	0.86 (0.56, 1.33)	0.87 (0.56, 1.35)
Pain 5 or 6 waves	0.66 (0.43, 1.01)	0.82 (0.52, 1.30)	0.84 (0.55, 1.27)	0.95 (0.60, 1.49)
Frequent petting	N= 986	N= 951	N= 848	N= 831
Cumulative pain score				
No pain	Reference	Reference	Reference	Reference
Pain 1 or 2 waves	1.04 (0.74, 1.45)	0.95 (0.67, 1.35)	0.82 (0.56, 1.20)	0.86 (0.58, 1.29)
Pain 3 or 4 waves	0.70 (0.46, 1.07)	0.68 (0.43, 1.07)	0.94 (0.61, 1.45)	1.08 (0.68, 1.70)
Pain 5 or 6 waves	0.81 (0.54, 1.23)	0.98 (0.62, 1.55)	1.05 (0.68, 1.62)	1.20 (0.74, 1.94)
Frequent masturbation	N= 985	N= 951	N= 846	N= 828
Cumulative pain score				
No pain	Reference	Reference	Reference	Reference
Pain 1 or 2 waves	1.06 (0.75, 1.48)	1.02 (0.73, 1.47)	1.08 (0.61, 1.92)	0.98 (0.54, 1.76)
Pain 3 or 4 waves	0.86 (0.56, 1.33)	0.84 (0.53, 1.33)	1.34 (0.72, 2.50)	1.23 (0.63, 2.39)
Pain 5 or 6 waves	0.81 (0.53, 1.23)	0.74 (0.46, 1.19)	0.89 (0.45, 1.76)	0.80 (0.39, 1.66)

Model 1: adjusted for age. Model 2: adjusted for age, smoking status, depressive symptoms, partner status, age left education, alcohol consumption and number of comorbidities.
*$p \leq 0.05$.

Table 5 Association of sexual difficulties with pain severity and cumulative pain, among those reporting any sexual activity in the past year

Sexual difficulties	Men		Women	
	Model 1	Model 2	Model 1	Model 2
Pain severity				
Erection difficulties	N= 2067	N= 2000		
Pain status				
None	Reference	Reference		
Mild	1.26 (0.84, 1.90)	1.06 (0.69, 1.63)		
Moderate/severe	1.68 (1.27, 2.21)**	1.11 (0.82, 1.49)		
Arousal difficulties			N= 1433	N= 1404
Pain status				
None			Reference	Reference
Mild			1.08 (0.73, 1.58)	1.06 (0.72, 1.57)
Moderate/severe			1.32 (0.99, 1.78)	1.19 (0.86, 1.65)
Dry vagina difficulties			N= 1409	N= 1383
Pain status				
None			Reference	Reference
Mild			0.99 (0.66, 1.48)	0.97 (0.64, 1.48)
Moderate/severe			0.99 (0.70, 1.39)	0.90 (0.61, 1.34)
Pain during sexual activities			N= 1411	N= 1384
Pain status				
None			Reference	Reference
Mild			1.02 (0.61, 1.71)	1.06 (0.62, 1.80)
Moderate/severe			1.55 (0.99, 2.43)	1.56 (0.95, 2.54)
Cumulative pain				
Erection difficulties	N= 987	N= 952		
Cumulative pain score				
No pain	Reference	Reference		
Pain 1 or 2 waves	1.46 (1.04, 2.07)*	1.37 (0.96, 1.95)		
Pain 3 or 4 waves	1.39 (0.88, 2.18)	1.13 (0.69, 1.85)		
Pain 5 or 6 waves	1.70 (1.12, 2.58)*	1.26 (0.81, 1.97)		
Arousal difficulties			N= 645	N= 633
Cumulative pain score				
No pain			Reference	Reference
Pain 1 or 2 waves			1.34 (0.87, 2.07)	1.30 (0.83, 2.04)
Pain 3 or 4 waves			0.86 (0.52, 1.42)	0.85 (0.51, 1.42)
Pain 5 or 6 waves			1.38 (0.85, 2.24)	1.30 (0.76, 2.20)
Dry vagina difficulties			N= 633	N= 622
Cumulative pain score				
No pain			Reference	Reference
Pain 1 or 2 waves			1.06 (0.64, 1.75)	1.08 (0.65, 1.81)
Pain 3 or 4 waves			1.38 (0.81, 2.34)	1.42 (0.80, 2.51)
Pain 5 or 6 waves			1.61 (0.96, 2.70)	1.60 (0.90, 2.84)
Pain during sexual activities			N= 634	N= 622
Cumulative pain score				
No pain			Reference	Reference
Pain 1 or 2 waves			1.25 (0.58, 2.68)	1.23 (0.58, 2.62)
Pain 3 or 4 waves			2.31 (1.13, 4.70)*	2.12 (0.98, 4.59)
Pain 5 or 6 waves			2.17 (1.04, 4.52)*	1.80 (0.79, 4.08)

Model 1: adjusted for age. Model 2: adjusted for age, smoking status, depressive symptoms, partner status, age left education, alcohol consumption and number of comorbidities.
*$p \leq 0.05$. **$p \leq 0.001$.

Table 6 Association of sexual concerns with pain severity and cumulative pain, among those reporting any sexual activity in the past year

Sexual concerns	Men		Women	
	Model 1	Model 2	Model 1	Model 2
Pain severity				
Desire	N= 2076	N= 2009	N= 1829	N= 1785
Pain status				
None	Reference	Reference	Reference	Reference
Mild	1.11 (0.67, 1.84)	0.94 (0.58, 1.53)	1.18 (0.70, 1.99)	1.24 (0.71, 2.18)
Moderate/severe	1.68 (1.19, 2.36)*	1.37 (0.96, 1.96)	1.23 (0.81, 1.87)	1.26 (0.79, 2.03)
Activity	N= 2069	N= 2002	N= 1821	N= 1777
Pain status				
None	Reference	Reference	Reference	Reference
Mild	1.05 (0.69, 1.61)	0.92 (0.58, 1.45)	1.24 (0.67, 2.29)	1.16 (0.59, 2.27)
Moderate/severe	1.87 (1.33, 2.63)**	1.58 (1.10, 2.27)*	1.29 (0.82, 2.03)	1.16 (0.70, 1.95)
Arousal			N= 1424	N= 1396
Pain status				
None			Reference	Reference
Mild			0.83 (0.44, 1.56)	0.76 (0.38, 1.53)
Moderate/severe			1.50 (0.89, 2.53)	1.33 (0.74, 2.42)
Erection	N= 2076	N= 2009		
Pain status				
None	Reference	Reference		
Mild	1.48 (0.90, 2.40)	1.29 (0.79, 2.11)		
Moderate/severe	2.00 (1.46, 2.74)**	1.44 (1.00, 2.07)*		
Orgasm	N= 1767	N= 1716	N= 1362	N= 1336
Pain status				
None	Reference	Reference	Reference	Reference
Mild	1.09 (0.54, 2.21)	0.91 (0.46, 1.80)	1.35 (0.61, 2.99)	1.32 (0.60, 2.94)
Moderate/severe	1.73 (1.18, 2.52)*	1.15 (0.76, 1.73)	1.67 (0.95, 2.94)	1.68 (0.90, 3.14)
Overall concern	N= 2046	N= 1983	N= 1767	N= 1724
Pain status				
None	Reference	Reference	Reference	Reference
Mild	1.26 (0.81, 1.98)	1.09 (0.69, 1.70)	1.30 (0.81, 2.09)	1.27 (0.76, 2.15)
Moderate/severe	2.07 (1.54, 2.78)**	1.55 (1.12, 2.15)*	1.40 (0.98, 2.01)	1.36 (0.90, 2.05)
Cumulative pain				
Desire	N= 990	N= 955	N= 855	N= 836
Cumulative pain score				
No pain	Reference	Reference	Reference	Reference
Pain 1 or 2 waves	1.71 (1.06, 2.77)*	1.50 (0.91, 2.46)	1.42 (0.67, 2.99)	1.31 (0.61, 2.79)
Pain 3 or 4 waves	1.41 (0.79, 2.52)	1.32 (0.73, 2.39)	1.66 (0.75, 3.69)	1.45 (0.62, 3.39)
Pain 5 or 6 waves	1.83 (1.07, 3.14)*	1.28 (0.69, 2.36)	2.55 (1.22, 5.35)*	2.05 (0.91, 4.64)
Activity	N= 988	N= 953	N= 855	N= 811
Cumulative pain score				
No pain	Reference	Reference	Reference	Reference
Pain 1 or 2 waves	2.26 (1.37, 3.74)**	1.98 (1.17, 3.36)*	1.33 (0.56, 3.16)	1.12 (0.47, 2.71)
Pain 3 or 4 waves	2.08 (1.12, 3.87)*	1.99 (1.05, 3.74)*	0.81 (0.26, 2.51)	0.46 (0.14, 1.46)
Pain 5 or 6 waves	2.65 (1.49, 4.72)**	1.95 (1.01, 3.77)*	3.45 (1.54, 7.72)*	2.12 (0.86, 5.23)

Arousal			N= 640	N= 608
Cumulative pain score				
No pain			Reference	Reference
Pain 1 or 2 waves			2.31 (0.85, 6.24)	2.15 (0.77, 6.01)
Pain 3 or 4 waves			3.16 (1.00, 9.96)*	2.25 (0.80, 6.31)
Pain 5 or 6 waves			2.66 (0.95, 7.40)	2.11 (0.69, 6.47)
Erection	N= 990	N= 955		
Cumulative pain score				
No pain	Reference	Reference		
Pain 1 or 2 waves	1.58 (1.02, 2.47)*	1.36 (0.85, 2.17)		
Pain 3 or 4 waves	2.00 (1.16, 3.44)*	1.80 (1.01, 3.21)*		
Pain 5 or 6 waves	2.46 (1.51, 4.00)**	2.07 (1.22, 3.52)*		
Orgasm	N= 815	N= 791	N= 609	N= 579
Cumulative pain score				
No pain	Reference	Reference	Reference	Reference
Pain 1 or 2 waves	0.97 (0.57, 1.64)	0.91 (0.53, 1.56)	1.40 (0.47, 4.22)	1.60 (0.50, 5.12)
Pain 3 or 4 waves	1.48 (0.74, 2.99)	1.16 (0.54, 2.49)	1.78 (0.56, 5.62)	1.96 (0.56, 6.93)
Pain 5 or 6 waves	1.72 (0.96, 3.07)	1.16 (0.62, 2.17)	3.23 (1.20, 8.74)*	3.48 (1.11, 10.94)*
Overall concern	N= 971	N= 939	N= 823	N= 805
Cumulative pain score				
No pain	Reference	Reference	Reference	Reference
Pain 1 or 2 waves	1.01 (0.63, 1.62)	0.92 (0.56, 1.49)	1.40 (0.74, 2.63)	1.24 (0.66, 2.35)
Pain 3 or 4 waves	1.85 (1.11, 3.09)*	1.68 (0.99, 2.86)	1.73 (0.85, 3.50)	1.41 (0.66, 3.02)
Pain 5 or 6 waves	2.47 (1.56, 3.90)**	1.88 (1.12, 3.14)*	2.50 (1.33, 4.73)*	1.78 (0.88, 3.61)

Model 1: adjusted for age. Model 2: adjusted for age, smoking status, depressive symptoms, partner status, age left education, alcohol consumption and number of comorbidities.
*$p \leq 0.05$. **$p \leq 0.001$.

Appendix 1 The association between pain/any sexual activity in the last 12 months and the adjustment variables included in the logistic regression analyses (Tables 4, 5 and 6)

Adjustment variables	Whether often troubled with pain	Any sexual activity in the last 12 months
	Odds ratio (95% confidence intervals)	
Age	1.00 (1.00, 1.01)	0.90 (0.90, 0.91)**
Smoking status		
Smoker	1.25 (1.02, 1.52)*	0.81 (0.69, 0.95)*
Depressive symptoms	3.69 (2.93, 4.65)**	0.53 (0.45, 0.62)**
Partner status		
Never married	0.72 (0.54, 0.97)*	0.57 (0.45, 0.71)**
Divorced or separated	0.94 (0.77, 1.15)	0.46 (0.39, 0.54)**
Widowed	0.95 (0.72, 1.26)	0.13 (0.11, 0.15)**
Age left education		
15-18 years	1.01 (0.74, 1.40)	3.11 (2.54, 3.80)**
>=19 years	0.55 (0.39, 0.78)**	5.83 (4.63, 7.35)**
Alcohol consumption		
Regularly	0.61 (0.52, 0.72)**	2.65 (2.35, 3.00)**
Very frequently	0.58 (0.48, 0.71)**	3.19 (2.73, 3.72)**
Number of comorbidities		
1	1.91 (1.62, 2.24)**	0.70 (0.61, 0.81)**
2	3.05 (2.53, 3.68)**	0.41 (0.35, 0.47)**
>3	5.92 (4.62, 7.59)**	0.28 (0.23, 0.33)**

*$p \leq 0.05$. **$p \leq 0.001$.