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Gender differences in musculoskeletal pain across age and functional domains: a cross-sectional study of 18,516 desk- based workers

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Article

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Abstract

Women report more musculoskeletal (MSK) pain than men, but this is often summarised as a single prevalence difference. Whether the gap varies across the adult age range, and whether women and men with equally rated pain experience the same consequences, is less clear, particularly in the growing desk-based workforce. We examined how the MSK pain gap between women and men varies across age and across functional domains. Cross-sectional analysis of 18,516 desk-based workers (10,521 women, 7,995 men) who completed a digital workplace MSK assessment during 2025. Pain intensity was self-reported on an 11-point numerical rating scale (NRS). Participants reporting any pain indicated whether it affected each of five functional domains (mental health, productivity, sleep, social participation, concentration) and whether they had sought healthcare or been absent from work. Gender was self-reported (woman or man). We compared prevalence (chi-square), intensity (t-test) and domain-specific impact using logistic regression (unadjusted and age-adjusted), and tested gender-by-age interactions on the odds of reporting pain and on pain intensity. Reporting follows the STROBE guidance for cross-sectional studies. Pain prevalence was higher in women than men (59.4% vs 46.8%; odds ratio [OR] 1.66, 95% confidence interval [CI] 1.56 to 1.76; $p < 0.001$). The gap was progressively larger across older age bands (10.6, 12.8 and 14.0 percentage points [pp] at 18 to 30, 31 to 50 and 50+), reflecting a steeper decline in men, although the gender-by-age interaction on prevalence did not reach significance (OR 1.005 per year, 95% CI 0.999 to 1.010; $p = 0.10$). Among those in pain, mean intensity was higher in women (4.47 vs 4.13; $p < 0.001$) and diverged with age as women's intensity rose and men's fell, a divergence confirmed by a significant gender-by-age interaction on intensity (0.009 NRS points per year, 95% CI 0.001 to 0.016; $p = 0.024$). Impact was domain-specific rather than uniform: at equivalent pain, women had higher odds of having sought healthcare (OR 1.40), of sleep disturbance (1.31), of mental-health impact (1.31), of concentration impact (1.14) and, more modestly, of absence (1.13), whereas productivity (0.96) and social participation (1.01) did not differ. In a large desk-based sample, the gender gap in MSK pain was larger in older workers and concentrated in specific domains, suggesting the burden differs in kind, not only in degree. The age-related divergence was clearest and statistically supported for pain intensity. Workplace MSK programmes that report a single pooled prevalence may understate the burden carried by older women and miss where that burden falls.

Background

Musculoskeletal (MSK) pain is among the most common and disabling health complaints worldwide, and it does not fall equally on women and men. Population studies consistently report a higher prevalence of MSK pain in women across most anatomical sites and most definitions of chronicity [1–5], and MSK conditions are a leading contributor to years lived with disability globally [6]. This female predominance is well established and is mirrored in clinical and experimental work showing, on average, greater pain sensitivity and higher clinical pain risk in women [7–11].

Two features of this literature are less settled. First, the difference between women and men is often presented as a single number, as though it were constant across the life course. Yet there are reasons to

expect it to vary with age. Several MSK conditions that affect women disproportionately become more common around and after midlife, and the perimenopausal transition has been linked to increased MSK pain, sometimes described as a musculoskeletal syndrome of menopause [2, 12–15]. If the gap varies with age, a pooled prevalence figure will average across groups in which the disparity is small and groups in which it is large, obscuring the people most affected. Second, most analyses compare whether women and men have pain, or how intense it is, but not what that pain does to their lives at a given intensity. Pain of the same rated severity may carry different consequences for different people [16–18]. Gendered patterns in how pain is expressed, coped with and responded to in healthcare settings are well documented [19, 20], raising the possibility that the consequences of pain are distributed differently even when the pain itself is rated identically.

The desk-based workforce is a useful and under-studied setting for these questions. It is large, increasingly monitored through digital health tools, and exposed to a recognised set of MSK risks related to sedentary posture and screen work [21–24], yet most occupational MSK surveillance reports outcomes for the workforce as a whole. Among working populations, pain and MSK symptoms have also been associated with reduced productivity, sickness absence, healthcare use and restrictions in daily functioning [25–28]. We used data from a digital workplace MSK assessment to ask three linked questions. Does the pain gap between women and men differ in size across the adult age range? Does pain intensity diverge by gender with age? And, at the same pain intensity, do the functional consequences of pain differ by gender and by domain? We measured gender rather than biological sex, and we return in the discussion to what this means for interpretation. Our central hypothesis was that the burden carried by women is not a fixed quantity but one that is larger at older ages and concentrates in particular domains.

Methods

Design and participants

This was a cross-sectional analysis of routinely collected, pseudonymised data from a digital workplace MSK assessment platform (VIDA, Vitrue Health). Adults in desk-based roles completed the assessment during 2025 as part of employer-provided wellbeing programmes, spanning a broad range of sectors with no single employer contributing a majority of assessments. From 21,471 completed desk assessments we restricted the analysis to participants who self-reported their gender as woman or man (n = 19,519), then excluded records with missing age and ages outside 18 to 80 years (removing implausible entries such as birth years), giving an analytic sample of 18,516 (10,521 women, 7,995 men). Participants who did not report a binary gender (recorded as other, prefer not to say, or not answered) were excluded from this gender-comparison analysis.

Measures

Pain intensity was self-reported on an 11-point NRS (0 to 10), with the maximum reported score across body regions used as each participant's pain intensity. Participants reporting any pain (NRS > = 1) also indicated their primary pain region and whether their pain affected each of five functional domains (mental health, productivity, sleep, social participation and concentration), together with whether they had sought healthcare for the pain and whether it had led to work absence. Each impact domain was recorded as a binary outcome, with healthcare-seeking and absence coded as present only where explicitly reported. Age was recorded in years and grouped into three bands (18 to 30, 31 to 50, 50+).

Sex and gender

The assessment item asked participants their gender, with responses recorded as woman or man for this analysis. In line with the SAGER reporting guidelines [29], we therefore use the term gender for this measured variable throughout, and reserve any reference to biological sex for the interpretation of possible mechanisms, which we could not test directly. Sex and gender cannot be disaggregated in these data.

Statistical analysis

Pain prevalence was compared between women and men using the chi-square test, overall and within each age band, and summarised as an odds ratio. Among participants reporting pain, mean NRS intensity was compared using an independent-samples t-test, and the distribution of primary pain region was compared using chi-square. To test whether the prevalence gap varied with age, we fitted a logistic regression for the presence of any pain with gender, age (centred and continuous) and their interaction; a significant interaction term would indicate that the gender difference in the odds of pain varies with age. We tested whether pain intensity diverged by gender with age using an analogous linear model for NRS intensity among pain reporters. To examine functional impact, we restricted the sample to participants reporting pain and modelled each domain as a binary outcome, estimating the odds of impact in women relative to men with 95% CIs, both unadjusted and adjusted for age. Comparing impact within the pain-reporting group holds the presence of pain constant, so that differences reflect the consequences of pain rather than its occurrence. Two-sided $p < 0.05$ was treated as statistically significant. Analyses were conducted in Python (pandas, statsmodels, scipy). The study was reported in accordance with the STROBE statement and the RECORD extension for studies using routinely collected data [30, 31].

Ethics and data

This study was a secondary analysis of routinely collected occupational health data that were gathered by an employer-provided assessment platform (VIDA, Vitrue Health) and were not collected for the purposes of this research. No experiments on human participants or human tissue were performed. All methods were carried out in accordance with relevant guidelines and regulations, including the principles of the Declaration of Helsinki. The analytic dataset was pseudonymised: direct identifiers were removed

and the researcher did not access identifiable information. A coding key that could enable re-identification is held separately by the data controller (Vitrue Health) and was not used for this analysis; no re-identification of participants was undertaken. Under the UK Health Research Authority governance criteria, this secondary analysis of routinely collected data not gathered for research did not require Research Ethics Committee review, and formal ethics approval was not required. Individual informed consent for this secondary analysis was not required, as the analysis used pseudonymised records and no re-identification was performed. A de-identified aggregate dataset supporting the findings is available from the author on reasonable request.

Results

Sample characteristics

The 18,516 participants comprised 10,521 women (56.8%) and 7,995 men (43.2%), distributed similarly across age bands (Table 1). Overall, 54.0% reported some pain. Women reported pain more often than men (59.4% vs 46.8%; OR 1.66, 95% CI 1.56 to 1.76) and, among those in pain, at higher mean intensity (4.47 vs 4.13 on the NRS).

Table 1
Sample characteristics by gender.

Characteristic	Women (n = 10,521)	Men (n = 7,995)	All (n = 18,516)
Age 18–30, n (%)	2,589 (24.6)	1,836 (23.0)	4,425 (23.9)
Age 31–50, n (%)	6,034 (57.4)	4,791 (59.9)	10,825 (58.5)
Age 50+, n (%)	1,898 (18.0)	1,368 (17.1)	3,266 (17.6)
Reported any pain, n (%)	6,248 (59.4)	3,745 (46.8)	9,993 (54.0)
Mean intensity, pain reporters (NRS)	4.47	4.13	4.34

The prevalence gap is larger at older ages

Pain prevalence was significantly higher in women than men overall (chi-square $p < 0.001$). The size of the gap was not constant across age: it rose from 10.6 pp in the youngest band to 14.0 pp in the oldest (Table 2), reflecting a steeper decline in prevalence among men (52.3% to 42.5%) than among women (62.9% to 56.6%). However, when age was modelled continuously, the gender-by-age interaction did not reach significance (OR 1.005 per year, 95% CI 0.999 to 1.010; $p = 0.10$). We therefore describe the widening as a descriptive age gradient rather than a formally significant interaction.

Table 2
Pain prevalence by gender and age band.

Age band	Women, %	Men, %	Gap (pp)
18–30	62.9	52.3	+ 10.6
31–50	58.8	46.0	+ 12.8
50+	56.6	42.5	+ 14.0

Intensity diverges by gender with age

Among participants reporting pain, the sexes diverged in intensity across the age range (Fig. 1B). Women's mean NRS intensity rose across the three bands (4.36, 4.47, 4.66), while men's fell (4.06, 4.20, 3.99). This divergence was confirmed by a significant gender-by-age interaction on intensity (0.009 NRS points per year, 95% CI 0.001 to 0.016; p = 0.024). Whereas the prevalence gradient was descriptive, the intensity divergence was statistically supported, and it provides the clearest evidence that the gender difference in this sample changes with age.

Impact is domain-specific, not uniform

Restricting to participants in pain isolates the consequences of pain from its occurrence. Here the pattern was not a uniform female excess across every domain but a selective one (Table 3, Fig. 1C). Women had significantly higher odds than men of having sought healthcare (OR 1.40, 95% CI 1.29 to 1.52), of reporting that pain affected sleep (1.31, 1.20 to 1.43) and mental health (1.31, 1.18 to 1.45), of concentration impact (1.14, 1.03 to 1.25) and, more modestly, of work absence (1.13, 1.00 to 1.28). In contrast, productivity impact (0.96, 0.86 to 1.06) and social-participation impact (1.01, 0.92 to 1.11) did not differ between women and men. The pattern was essentially unchanged after adjustment for age (Table 3), indicating that the domain selectivity is not an artefact of the age composition of the two groups.

Table 3
Functional impact among participants reporting pain, women relative to men, unadjusted and age-adjusted. * p < 0.05, ** p < 0.01, *** p < 0.001.

Impact domain	Women %	Men %	Unadjusted OR (95% CI)	Age-adjusted OR (95% CI)
Sought healthcare	44.6	36.6	1.40 (1.29–1.52) ***	1.41 (1.30–1.53) ***
Sleep	36.8	30.8	1.31 (1.20–1.43) ***	1.31 (1.20–1.43) ***
Mental health	21.9	17.6	1.31 (1.18–1.45) ***	1.31 (1.18–1.45) ***
Concentration	25.8	23.4	1.14 (1.03–1.25) **	1.14 (1.03–1.25) **
Absence	13.4	12.0	1.13 (1.00-1.28) *	1.14 (1.00-1.28) *
Productivity	18.9	19.6	0.96 (0.86–1.06)	0.95 (0.86–1.06)
Social participation	25.2	25.0	1.01 (0.92–1.11)	1.01 (0.92–1.11)

The distribution of primary pain region also differed by gender (chi-square p < 0.001): men more often reported the lower back as their primary site (38.1% vs 30.2%), whereas women more often reported the neck (24.1% vs 19.5%) and shoulder.

The age and domain patterns reinforce each other

The two strands came together most clearly for sleep. The sleep-impact gap was modest in younger workers (around 5 pp at 18 to 30 and 31 to 50) but widened to 13.1 pp in the 50 + band, where 42.5% of women in pain reported sleep disturbance against 29.4% of men. The domain in which women were already most disadvantaged was also the one in which the disadvantage was greatest at older ages, consistent with a burden that compounds rather than converges.

Discussion

In a large sample of desk-based workers, the MSK pain difference between women and men behaved less like a fixed quantity and more like a pattern that varies with age and concentrates in specific domains. Three findings support this. The prevalence gap was progressively larger across older age bands, driven by a steeper decline in men, although this age gradient was descriptive and the formal interaction did not reach significance. Pain intensity among those affected diverged in the same direction, rising in women and falling in men, and here the gender-by-age interaction was statistically significant. And the functional consequences of equivalently rated pain were selective: greater in women for healthcare-seeking, sleep and mental health, but indistinguishable between women and men for productivity and social participation.

These results extend the established picture of higher MSK pain prevalence in women [1, 2] in two ways relevant to occupational health. The age finding suggests that a single pooled prevalence figure averages across a smaller disparity in younger workers and a larger one in older workers, so the group least visible in the average, older women, may carry the heaviest relative load. The clearest age-related

signal was for intensity rather than prevalence, which argues for reporting severity, and not only whether pain is present, in workplace surveillance. The domain finding suggests the difference is partly qualitative. A uniform female excess would point to a simple difference in severity or reporting; the observed selectivity, with sleep, mental-health and healthcare consequences elevated but productivity and social impact not, points instead to a difference in how the same pain is experienced and acted upon, consistent with qualitative as well as quantitative sex and gender differences in pain [16–18]. The prominence of sleep is also consistent with the established bidirectional relationship between sleep disturbance and pain [32]. The strong healthcare-seeking signal is open to more than one reading, including that women escalate care earlier or that men under-present even at comparable pain, a tension consistent with documented gendered norms around pain expression and help-seeking [17,19,20,33].

Because we measured gender rather than biological sex, the mechanisms behind these patterns cannot be resolved here. The age-related divergence is compatible with biological contributors such as the hormonal changes of midlife that have been linked to MSK pain in women [2, 12–15], but it is equally compatible with gendered differences in how pain is reported and managed [8, 9], and our data cannot separate these. We therefore frame the findings as gender differences observed in a screening and surveillance context, and treat any biological interpretation as hypothesis-generating for studies able to measure sex, menopausal status and hormonal exposure directly.

For workplace MSK programmes, the practical implication is that headline prevalence is an insufficient summary. Reporting stratified by gender and age would make visible the groups in whom the burden is greatest, and attention to sleep and mental-health consequences, rather than productivity alone, would better reflect where pain affects women. We frame these as associations; the cross-sectional design does not support causal or clinical-decision claims.

Strengths and limitations

The principal strength is scale: more than 18,000 participants from a single, consistently administered digital assessment, allowing age bands and individual impact domains to be examined with precision. The main limitations follow from the design and the data source. The study is cross-sectional, so the age patterns describe differences across age groups at one time, not change within individuals, and no causal inference is warranted. Pain and its impacts were self-reported, and the impact domains binary, without information on chronicity, diagnosis or treatment. Gender was self-reported as a binary category, so these findings do not speak to non-binary populations, who were excluded, and sex and gender could not be distinguished. The sample is drawn from employees whose employers offer digital wellbeing assessments and may not represent the wider working population; healthier-worker effects are possible, and we lacked individual-level detail on occupation and job role. The impact models were adjusted for age but not for other potential confounders such as comorbidity or job type, which were not available; the near-identical unadjusted and age-adjusted estimates nonetheless argue against a simple confounding explanation for the observed domain selectivity. A planned follow-on analysis will examine these relationships with more fully adjusted modelling.

Conclusions

Among desk-based workers, the gender gap in MSK pain was larger at older ages and concentrated in sleep, mental-health and healthcare-seeking outcomes rather than spread evenly across all consequences of pain, with the clearest age-related divergence seen for pain intensity. The burden carried by women appears to differ from that carried by men in kind as well as in degree. Occupational MSK surveillance that reports a single pooled prevalence risks understating the load on older women and missing where it falls; stratified reporting and attention to pain intensity, sleep and mental-health impact would give a truer picture.

Declarations

Ethics approval and consent to participate.

This study was a secondary analysis of routinely collected occupational health data that were not collected for research purposes. The analytic dataset was pseudonymised: direct identifiers were removed and no identifiable personal data were accessed by the researcher. A coding key that could enable re-identification is held separately by the data controller (Vitrue Health) and was not used for this analysis; no re-identification was performed. No experiments on human participants or human tissue were performed. All methods were carried out in accordance with relevant guidelines and regulations, including the Declaration of Helsinki. Under the UK Health Research Authority governance criteria, this secondary analysis of routinely collected data not gathered for research did not require Research Ethics Committee approval, and individual informed consent was not required, as the analysis used pseudonymised records and no re-identification was undertaken.

Consent for publication.

Not applicable.

Competing interests.

The author is an employee of Vitrue Health, which develops the digital assessment platform used in this study. The employer had no role in the analysis or the decision to publish.

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Author Contribution

T.L.N.T. is the sole author. T.L.N.T. conceived and designed the study, performed the data analysis, prepared Figures 1, and wrote and approved the final manuscript.

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AI usageThe author used Claude (Anthropic), an AI assistant, to support drafting and editing of the manuscript. All analyses were reproduced from the source data and all outputs were checked and are the responsibility of the author.

Data Availability

The individual-level dataset is proprietary to Vitrue Health and is not publicly available; a de-identified aggregate dataset supporting the findings is available from the author on reasonable request and can be deposited in a public repository on acceptance.

References

1. Wijnhoven HAH, de Vet HCW, Picavet HSJ. Prevalence of musculoskeletal disorders is systematically higher in women than in men. Clin J Pain. 2006;22(8):717-724.
2. Overstreet DS, Strath LJ, Jordan M, et al. A brief overview: sex differences in prevalent chronic musculoskeletal conditions. Int J Environ Res Public Health. 2023;20(5):4521. doi:10.3390/ijerph20054521.
3. Andersson HI, Ejlertsson G, Leden I, Rosenberg C. Chronic pain in a geographically defined general population: studies of differences in age, gender, social class, and pain localisation. Clin J Pain. 1993;9(3):174–182. doi:10.1097/00002508-199309000-00004
4. Fayaz A, Croft P, Langford RM, Donaldson LJ, Jones GT. Prevalence of chronic pain in the UK: a systematic review and meta-analysis of population studies. BMJ Open. 2016;6(6):e010364. doi:10.1136/bmjopen-2015-010364.
5. Tsang A, Von Korff M, Lee S, et al. Common chronic pain conditions in developed and developing countries: gender and age differences and comorbidity with depression-anxiety disorders. J Pain. 2008;9(10):883-891.
6. GBD 2021 Low Back Pain Collaborators. Global, regional, and national burden of low back pain, 1990-2020, its attributable risk factors, and projections to 2050: a systematic analysis of the Global Burden of Disease Study 2021. Lancet Rheumatol. 2023;5(6):e316-e329.
7. Fillingim RB, King CD, Ribeiro-Dasilva MC, Rahim-Williams B, Riley JL. Sex, gender, and pain: a review of recent clinical and experimental findings. J Pain. 2009;10(5):447-485.
8. Bartley EJ, Fillingim RB. Sex differences in pain: a brief review of clinical and experimental findings. Br J Anaesth. 2013;111(1):52-58.

9. Ruau D, Liu LY, Clark JD, Angst MS, Butte AJ. Sex differences in reported pain across 11,000 patients captured in electronic medical records. J Pain. 2012;13(3):228-234.
10. Racine M, Tousignant-Laflamme Y, Kloda LA, Dion D, Dupuis G, Choinière M. A systematic literature review of 10 years of research on sex/gender and experimental pain perception—part 1: are there really differences between women and men? Pain. 2012;153(3):602–618. doi:10.1016/j.pain.2011.11.025.
11. Greenspan JD, Craft RM, LeResche L, et al.; Consensus Working Group of the Sex, Gender, and Pain SIG of the IASP. Studying sex and gender differences in pain and analgesia: a consensus report. Pain. 2007;132 Suppl 1:S26–S45. doi:10.1016/j.pain.2007.10.014.
12. Wright VJ, Schwartzman JD, Itinoche R, Wittstein J. The musculoskeletal syndrome of menopause. Climacteric. 2024;27(5):466-472.
13. Lu CB, Liu PF, Zhou YS, et al. Musculoskeletal pain during the menopausal transition: a systematic review and meta-analysis. Neural Plast. 2020;2020:8842110. doi:10.1155/2020/8842110.
14. Dugan SA, Powell LH, Kravitz HM, Everson-Rose SA, Karavolos K, Luborsky J. Musculoskeletal pain and menopausal status. Clin J Pain. 2006;22(4):325–331. doi:10.1097/01.ajp.0000208249.07949.d5.
15. Gao HL, Lin SQ, Wei Y, Chen Y, Wu ZL. The effect of age and menopausal status on musculoskeletal symptoms in Chinese women aged 35–64 years. Climacteric. 2013;16(6):639–645. doi:10.3109/13697137.2013.769095.
16. Mogil JS. Qualitative sex differences in pain processing: emerging evidence of a biased literature. Nat Rev Neurosci. 2020;21(7):353-365.
17. Wijnhoven HAH, de Vet HCW, Picavet HSJ. Sex differences in consequences of musculoskeletal pain. Spine (Phila Pa 1976). 2007;32(12):1360–1367. doi:10.1097/BRS.0b013e31805931fd.
18. Fillingim RB. Individual differences in pain: understanding the mosaic that makes pain personal. Pain. 2017;158 Suppl 1:S11–S18. doi:10.1097/j.pain.0000000000000775.
19. Samulowitz A, Gremyr I, Eriksson E, Hensing G. “Brave men” and “emotional women”: a theory-guided literature review on gender bias in health care and gendered norms towards patients with chronic pain. Pain Res Manag. 2018;2018:6358624.
20. Hoffmann DE, Tarzian AJ. The girl who cried pain: a bias against women in the treatment of pain. J Law Med Ethics. 2001;29(1):13-27.
21. Janwantanakul P, Pensri P, Jiamjarasrangsri V, Sinsongsook T. Prevalence of self-reported musculoskeletal symptoms among office workers. Occup Med (Lond). 2008;58(6):436–438. doi:10.1093/occmed/kqn072.
22. Wahlström J. Ergonomics, musculoskeletal disorders and computer work. Occup Med (Lond). 2005;55(3):168–176. doi:10.1093/occmed/kqi083.
23. Jensen C. Development of neck and hand-wrist symptoms in relation to duration of computer use at work. Scand J Work Environ Health. 2003;29(3):197–205. doi:10.5271/sjweh.722.

24. Wærsted M, Hanvold TN, Veiersted KB. Computer work and musculoskeletal disorders of the neck and upper extremity: a systematic review. BMC Musculoskelet Disord. 2010;11:79. doi:10.1186/1471-2474-11-79.
25. Hagberg M, Vilhemsson R, Wigaeus Tornqvist E, Toomingas A. Incidence of self-reported reduced productivity owing to musculoskeletal symptoms: association with workplace and individual factors among computer users. Ergonomics. 2007;50(11):1820–1834. doi:10.1080/00140130701674539.
26. Stewart WF, Ricci JA, Chee E, Morganstein D, Lipton R. Lost productive time and cost due to common pain conditions in the US workforce. JAMA. 2003;290(18):2443–2454. doi:10.1001/jama.290.18.2443.
27. Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. Eur J Pain. 2006;10(4):287–333. doi:10.1016/j.ejpain.2005.06.009.
28. Dueñas M, Ojeda B, Salazar A, Micó JA, Failde I. A review of chronic pain impact on patients, their social environment and the health care system. J Pain Res. 2016;9:457–467. doi:10.2147/JPR.S105892.
29. Heidari S, Babor TF, De Castro P, Tort S, Curno M. Sex and gender equity in research: rationale for the SAGER guidelines and recommended use. Res Integr Peer Rev. 2016;1:2.
30. von Elm E, Altman DG, Egger M, et al.; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology statement: guidelines for reporting observational studies. Lancet. 2007;370(9596):1453–1457. doi:10.1016/S0140-6736(07)61602-X.
31. Benchimol EI, Smeeth L, Guttmann A, et al.; RECORD Working Committee. The REporting of studies Conducted using Observational Routinely-collected health Data statement. PLoS Med. 2015;12(10):e1001885. doi:10.1371/journal.pmed.1001885.
32. Finan PH, Goodin BR, Smith MT. The association of sleep and pain: an update and a path forward. J Pain. 2013;14(12):1539-1552
33. Galdas PM, Cheater F, Marshall P. Men and health help-seeking behaviour: literature review. J Adv Nurs. 2005;49(6):616–623. doi:10.1111/j.1365-2648.2004.03331.x.

Figures

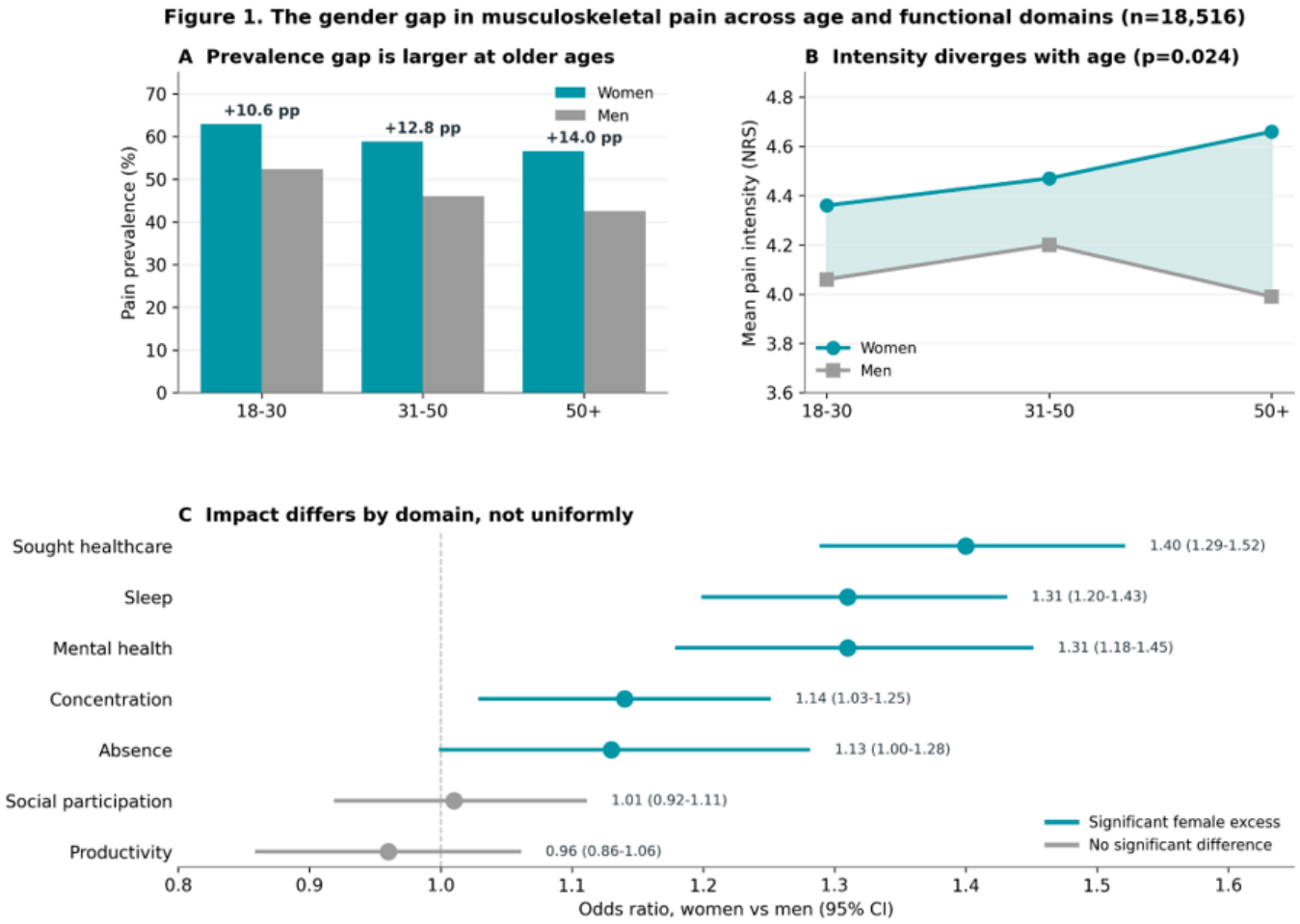

Figure 1

The gender gap in musculoskeletal pain across age and functional domains. (A) Pain prevalence by age band, with the percentage-point gap larger at older ages. (B) Mean NRS intensity among participants in pain; women's intensity rises with age while men's falls. (C) Odds of functional impact among participants in pain, women relative to men (odds ratio with 95% CI).