

Quantifying the impact of persistent musculoskeletal pain on employees at Rolls-Royce: a cross-sectional survey

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1.INTRODUCTION

- Persistent or chronic pain is defined as pain that persists or recurs for longer than 3 months.¹
- Musculoskeletal (MSK) pain in conditions such as lower back pain and osteoarthritis has been highlighted as one of the prominent causes of disability worldwide.²
- In a previous retrospective study at Rolls-Royce in the United Kingdom (UK), persistent MSK pain was associated with increased sickness absence and a substantial economic burden from the employer's perspective.³
- However, there are limited data on the impact of chronic MSK pain on work productivity and emotional wellbeing from the point of view of the employee.
- We aimed to investigate the impact of persistent MSK pain from the perspective of Rolls-Royce employees themselves including employee perceptions of workplace culture, to gain a more in depth understanding of the impact of MSK pain on work ability, sickness absence and the emotional impact of living with persistent pain.**

2. METHODS

- Data from Rolls-Royce employees were collected via an online cross-sectional survey conducted in the UK in 2021 (response rate = 5.60%).
- Two groups (based on self-reported experience of persistent MSK pain/ no pain) were compared using weighted regression analysis with Inverse Probability of Treatment Weighting (IPTW) controlling for age, sex, job role and health conditions (unrelated to pain).
- Outcome variables included:**
 - number of sickness absence days,
 - ratings of overall work ability from 0 (completely unable to work) - 10 (work ability at its best) from the Work Ability Index⁴ and work ability with respect to the physical/ psychological demands of work,
 - workplace accommodations and culture (e.g. line manager awareness of pain),
 - anxiety/ depression experienced over the past month.
- The impact of different types of MSK pain (joint, back, neck, muscle or tendon pain) was also investigated by comparing employees with and without each type of pain using weighted regressions with IPTW controlling for confounders.
- To control for the increased possibility of a type 1 error due to multiple comparisons, p-values <0.01 were considered statistically significant.
- Inclusion & exclusion criteria:**
 - ≥18 years old,
 - Employed by Rolls-Royce for >6 months.

MSK pain group:

Must have experienced MSK related pain for ≥3 months (any of joint pain, back pain, neck pain, muscle or tendon pain), that was rated >0 on a scale from 0 (no pain at all) - 10 (worst pain imaginable).

- Employees who were pregnant or who reported migraine pain/ persistent headache, pain due to cancer, chronic widespread pain (e.g. fibromyalgia) or nerve damage (e.g. numbness/ tingling/ carpal tunnel syndrome) were excluded from participation.
- The study was approved by the Western Copernicus Group Institutional Review Board.

3. RESULTS

- There were 298 employees in the pain group and 329 employees in the no pain group (n=627 in total).
- In total, 78.2% of the employees in the pain group and 75.1% of employees in the no pain group were male (Table 1). The majority of employees in both groups were in office-based roles (83% in the pain group; 85% in the no pain group).
- The most common pain reported was back pain, followed by joint pain (Figure 1).

Table 1. Employee demographics

	Pain group n=298	No pain group n=329
Sex (%)		
Male	78.2	75.1
Female	19.8	24.6
Age (%)		
18-30	17.4	30.4
31-40	21.8	29.2
41-50	28.5	25.8
51-60	29.2	12.5
61+	3.0	2.1
Job role (%)		
Office-based	82.6	85.1
Shop floor/ Factory based	14.1	12.2
Other	3.4	2.7
Other health conditions* (%)		
Diabetes	5.4	1.5
Obesity	3.7	0.9
Respiratory condition	10.4	8.2
Cardiovascular condition	9.7	3.0
Depression/ Anxiety	8.7	3.6
Other	12.4	3.3

*The list of conditions in the survey included any cancer, including Lymphoma, however, <1% of employees selected this option. Multiple health conditions could be selected. The percentages of other health conditions shown reflect those reported by the whole group (i.e. not just those who reported another health condition).

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Figure 1. The percentage of patients in the pain group that experienced each type of musculoskeletal pain n=298)

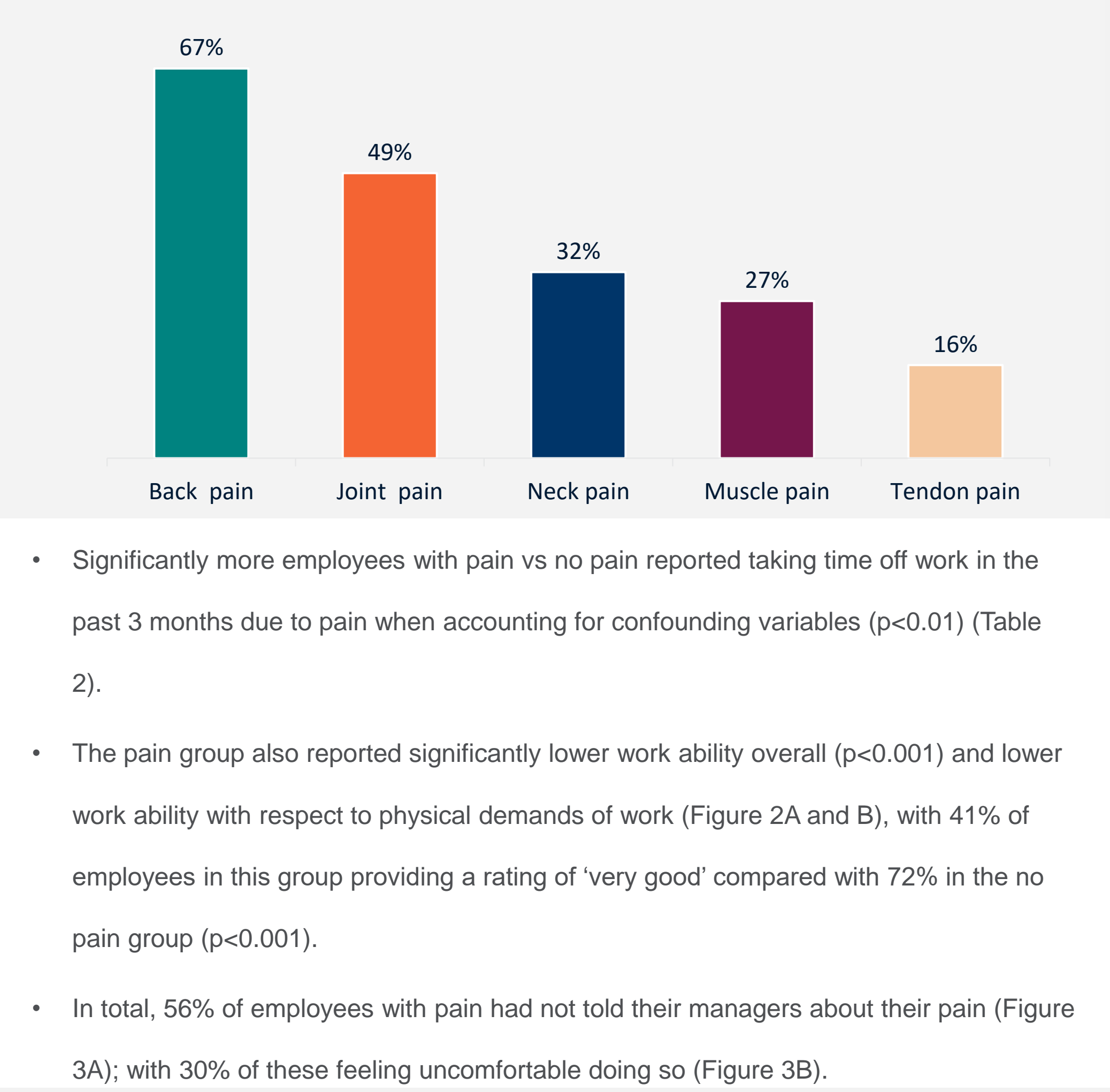


Table 2. Employee reported sickness absence

	Pain group n=298	No pain group n=329	Standard mean difference	p-value
In the last 3 months have you taken time off work specifically due to pain? (weighted %)¹	n=38	n=38		
Yes	3.9%	0.5%	0.23	<0.01
No	96.1%	99.5%	-0.23	
Work missed in the last 3 months due to pain (overall working days)²	n=14	n=2		
Weighted mean (SD)	0.3 (3.3)	0.0 (0.2)	-0.13	<0.001
Maximum number of days taken off in a row in the past 3 months due to pain n (weighted %)				
≤7 days absent in a row	99.4%	100.0%	-0.11	<0.001
≥8 days absent in a row	0.6%	0.0%	0.11	

SD = standard deviation

¹This question was only asked to respondents who had reported taking time off work in the past 3 months due to health-related issues (n=38 across both groups).

²This question was only asked to respondents who had reported taking time off work in the past 3 months specifically due to pain (n=14 in the pain group, n=2 in the no pain group).

Figure 2. Employee self-reported work ability

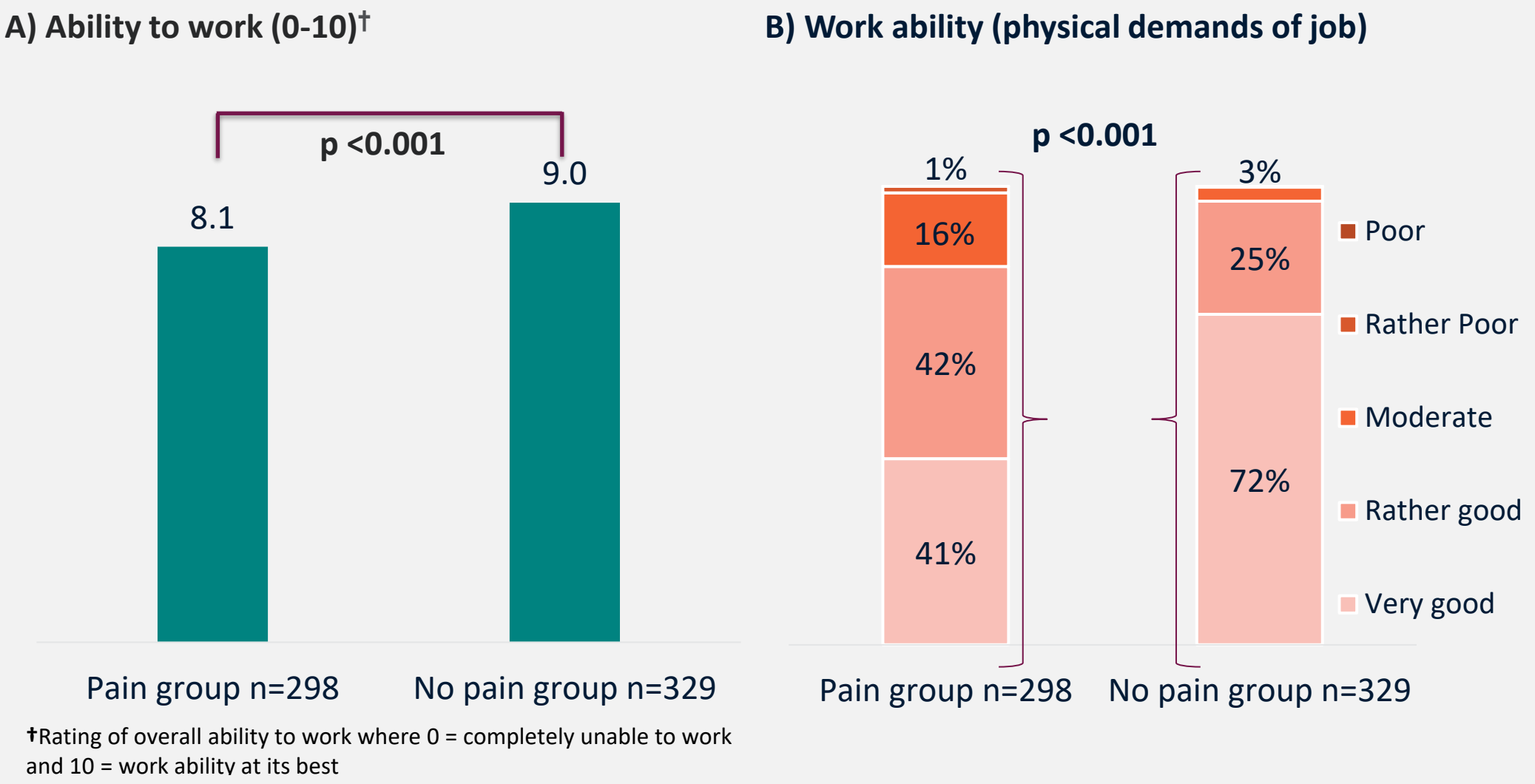
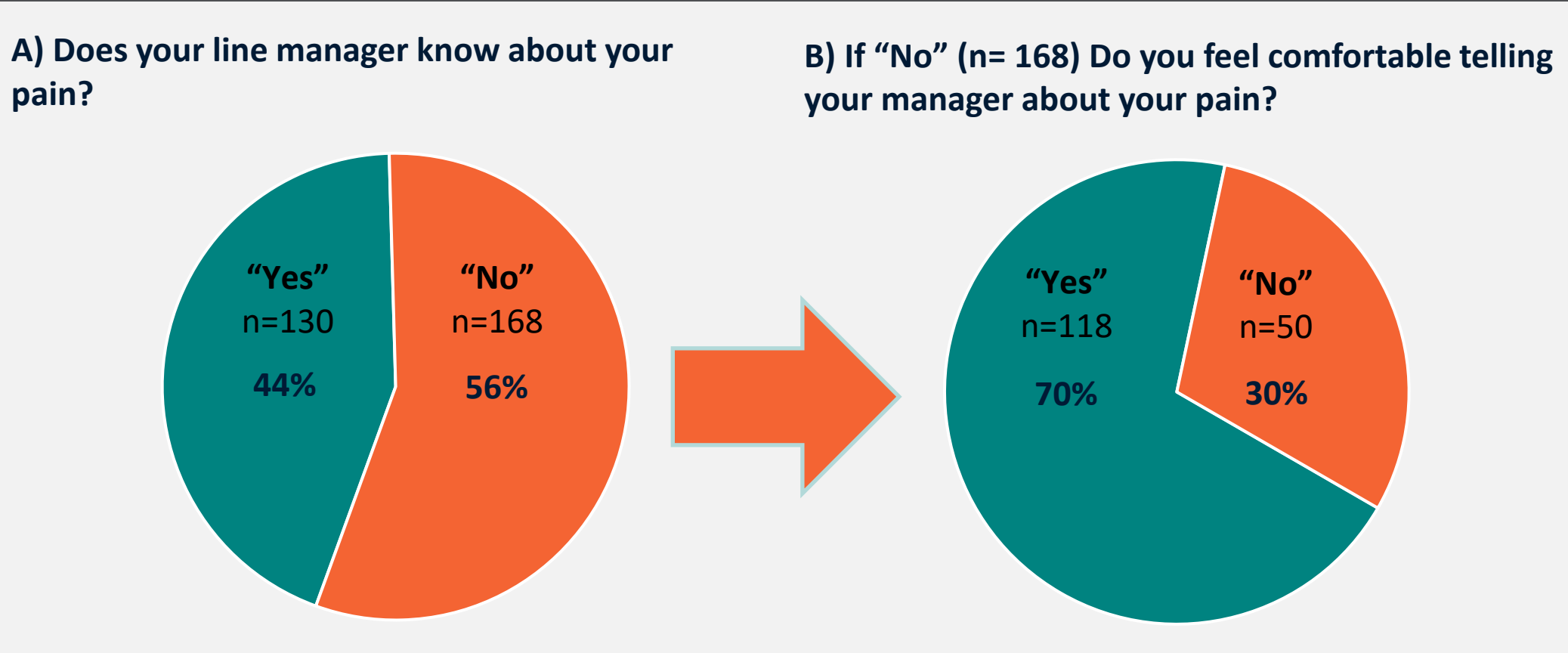


Figure 3. Employer Attitudes to Employee Pain



- 19% of employees with pain felt they did not have sufficient support at work for their pain (Figure 4).
- There was a non-significant tendency towards higher levels of depression and anxiety in the pain group when accounting for confounding variables (Figure 5A and B).
- Back pain had the greatest impact on the outcome variables, including significant effects on work ability (overall and in respect to the physical demands of work), and number of days off work in the prior 3 months due to pain, compared with employees who did not report back pain (Table 3).
- Joint, neck, muscle and tendon pain did not have a significant impact on self-reported work ability, but joint and neck pain had a significant impact on the number of days off work in the prior 3 months due to pain (both p <0.01).

Figure 4. Do you feel sufficient support and/ or accommodations have been provided to you at work to help you do your job with your pain? (pain group n=298)

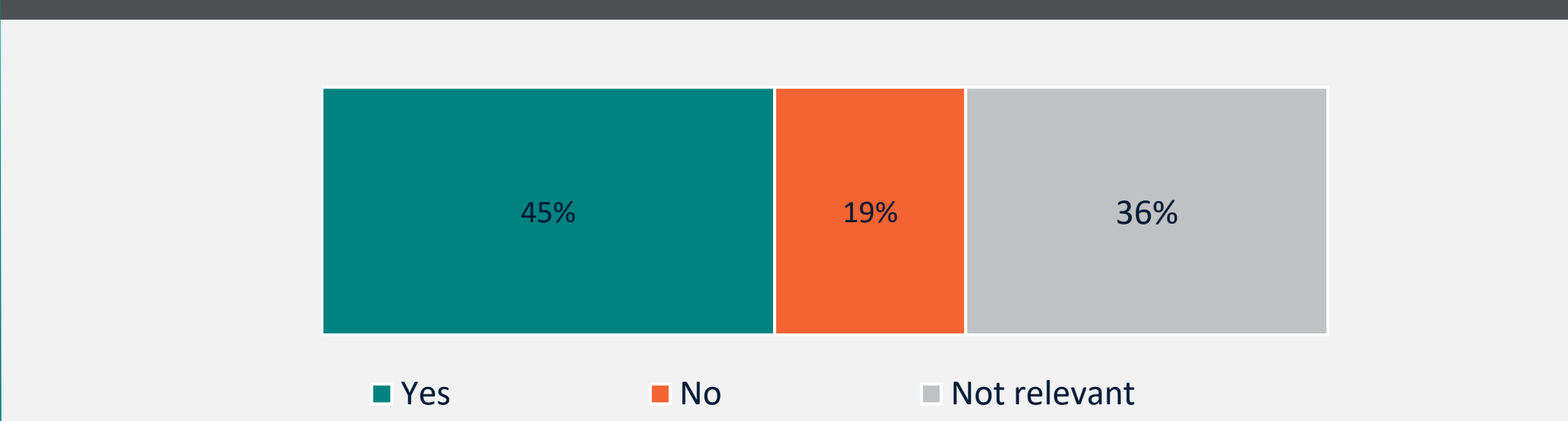


Figure 5. Feelings of anxiety or depression in the pain and no pain groups

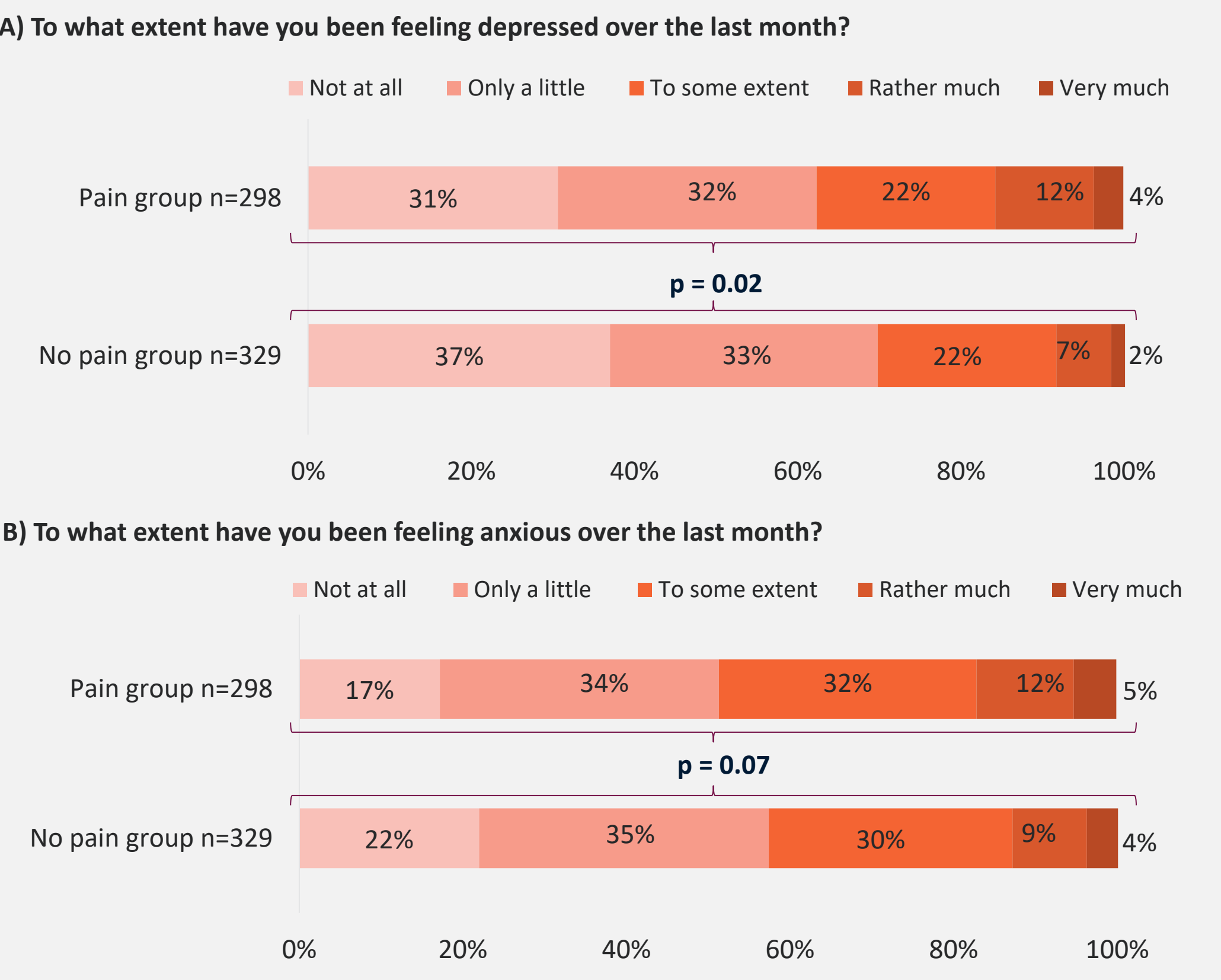


Table 3. Significant effects of back pain

	Back pain n=199	No back pain n=428	Coefficient/ odds ratio (CI [§])	p- value
Current work ability (0-10)[†] (coefficient)				
Marginal mean (marginal SE ^{††})	8.01 (0.11)	8.81 (0.07)	-0.81 (-1.08, -0.53)	<0.001
Work ability (physical demands) (weighted %) (odds ratio)				
Very good	38.5%	65.5%	3.09 (2.05, 4.64)	<0.001
Rather good	44.2%	28.1%		
Moderate	15.5%	5.8%		
Rather poor	1.4%	0.5%		
Poor	0.4%	0.1%		
Number of days off in the last 3 months due to pain (coefficient)				
Marginal mean (marginal SE)	1.77 (1.85)	0.11 (0.08)	2.78 (1.03, 4.54)	<0.01

[†]Confidence Interval

^{††}Rating of overall ability to work where 0 = completely unable to work and 10 = work ability at its best

[§]SE = standard error

4. CONCLUSIONS

- In line with a previous retrospective study at Rolls-Royce in the UK³, in which persistent MSK pain was associated with increased sickness absence, more employees with MSK pain reported taking time off work due to pain compared with employees without pain.
- Building on the findings from the retrospective study, in the current study, self-reported work ability was lower in employees with MSK pain compared with those without, with some employees feeling uncomfortable telling their manager about their pain.
- Despite the provision of high-quality occupational services at Rolls-Royce, some employees still reported feeling insufficiently supported in the workplace in relation to their pain.
- These findings highlight the importance of going beyond occupational health provision to create a workplace culture that encourages employees to disclose their work-relevant pain and could enable organisations to consider tailored support for their employees.

5. LIMITATIONS

- This survey focused on a single employer, and therefore the workforce may not be representative of other workplaces and the generalisability of the study may be limited.
- Data relating to MSK pain was dependent on the respondents' ability to accurately recall pain experience. The risk of recall bias was greater for those employees who had experienced pain for a longer period of time.

6. ACKNOWLEDGEMENTS

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7. DISCLOSURES

This study was sponsored by Pfizer. Authors affiliated with Pfizer participated in designing the study, interpreting the data, and writing the manuscript, and approved the final version for publication.

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