

# THE ASSOCIATION OF LUMBAR DISC DEGENERATION WITH LOW BACK PAIN IN MIDDLE AGE IN THE NORTHERN FINLAND BIRTH COHORT 1966

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## Background:

Although it has been suggested that lumbar disc degeneration (LDD) is a significant risk factor for low back pain (LBP), its role remains uncertain. Our objective was to clarify the association between LDD and LBP and whether mental distress modifies the association.

## Methods:

Participants of a birth cohort underwent 1.5-T lumbar magnetic resonance imaging at the age of 47. The association between the sum score of LDD (Pfirrmann classification, range 0–15) and LBP (categorized into “no pain”, “mild-to-moderate pain”, “bothersome-and-frequent pain”) was assessed using logistic regression analysis, with sex, smoking, body mass index, physical activity, occupational exposure, education, and presence of Modic changes and disc herniations as confounders. The modifying role of mental distress (according to the Hopkins Symptom Check List-25 [HSCL-25], the Beck Depression Inventory and the Generalized Anxiety Disorder Scale) in the association was analyzed using linear regression.

## Results:

Of the study population (n = 1 505), 15.2% had bothersome and frequent LBP, and 29.0% had no LBP. A higher LDD sum score increased the odds of belonging to the “mild-to-moderate pain” category (adjusted OR corresponding to an increase of one point in the LDD sum score 1.11, 95% CI 1.04–1.18, P = 0.003) and the “bothersome-and-frequent pain” category (adjusted OR 1.20, 95% CI 1.10–1.31, P < 0.001), relative to the “no pain” category. Mental distress significantly modified the association between LDD and LBP, as a linear positive association was consistently observed among individuals without mental distress according to HSCL-25 (adjusted B 0.16, 95% CI 0.07-0.26, P < 0.001), but not among individuals with higher mental distress.

## Conclusions:

LDD was significantly associated with both mild-to-moderate and bothersome-and-frequent LBP. However, the co-occurrence of mental distress diminished the association between LDD and LBP bothersomeness. Our results strongly suggest that mental symptoms affect the pain experience.

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# THE ROLE OF CO-OCCURRING INSOMNIA AND MENTAL DISTRESS IN THE ASSOCIATION BETWEEN LUMBAR DISC DEGENERATION AND LOW BACK PAIN RELATED DISABILITY

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## AIM

To investigate the role of co-occurring insomnia and mental distress in the association between lumbar disc degeneration (LDD) and the low back pain (LBP) related disability.

## METHODS: LDD

1080 individuals with LBP underwent 1.5-T MRI at a mean age 46.8 years.

LDD sum score (range 0–15) was constructed by summing the modified scores of each level:

- Pfirrmann grades I and II → '0'
- Grade III → '+1'
- Grade IV → '+2'
- Grade V → '+3'

## METHODS: LBP, INSOMNIA AND MENTAL DISTRESS

Data on demographics, lifestyle and musculoskeletal pains was collected by questionnaires. LBP-related disability: pain-related disability at work, during leisure time and during sleep (altogether).



Clinically relevant mental distress:

- ≥ 1.55 in the Hopkins Symptom Check List-25.

Clinically relevant insomnia

- ≥4 points in the Athens Insomnia Scale -5.

## METHODS: FOUR GROUPS

- 1) Absence of both mental distress and insomnia = No insomnia, no mental distress
- 2) Isolated mental distress = mental distress, no insomnia
- 3) Isolated insomnia = insomnia, no mental distress
- 4) Co-occurring mental distress and insomnia = both mental distress and insomnia

## Cross-sectional study

## RESULTS

**Table 1.** Mental distress and insomnia of study population (n=1080) with low back pain.

Mental distress % (n)	
No	75.6 (816)
Yes	21.3 (230)
Missing	3.1 (34)
Insomnia % (n)	
No	57.3 (619)
Yes	36.3 (392)
Missing	6.4 (69)
Mental distress and insomnia combined % (n)	
Absence of both mental distress and insomnia	49.3 (532)
Isolated mental distress	7.9 (85)
Isolated insomnia	24.1 (260)
Co-occurring mental distress and insomnia	12.2 (132)
Missing	6.6 (71)

**Table 2.** Association between lumbar disc degeneration (LDD) sum score and low back pain (LBP)-related disability, stratified by mental distress and insomnia.

Stratification	Unadjusted B (95% CI) (n=927)	Adjusted <sup>1</sup> B (95% CI) (n=843)
1. Absence of both mental distress and insomnia (n = 487)	<b>0.132 (0.044-0.221), p=0.003</b>	<b>0.132 (0.028-0.236), p=0.013</b>
2. Isolated mental distress (n=75)	<b>0.236 (0.001-0.471), p=0.049</b>	<b>0.345 (0.039-0.650), p=0.028</b>
3. Isolated insomnia (n=236)	<b>0.207 (0.068-0.346), p=0.004</b>	<b>0.207 (0.040-0.373), p=0.015</b>
4. Co-occurring mental distress and insomnia (n=129)	-0.075 (-0.267-0.116), p=0.438	-0.093 (-0.346-0.161), p=0.470

<sup>1</sup>: Adjusted for sex, smoking, body mass index, education, leisure-time physical activity, occupational physical exposure, Modic changes, and disc herniations.

**Bolded values are statistically significant**

## CONCLUSIONS:

**LDD does not seem to associate with the LBP-related disability when both insomnia and mental distress are present.** A positive association between LDD and LBP-related disability was observed among those with absence of both mental distress and insomnia, and among those with either isolated mental distress or isolated insomnia. This finding may be useful when planning treatment and rehabilitation that aim to reduce LBP-related disability among individuals with LDD and LBP.