# 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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## Background:

Lumbar disc degeneration (LDD) is associated with low back pain (LBP). Although both insomnia and mental distress appear to influence the pain experience, their role in the association between LDD and LBP is uncertain. Our objective was to investigate the role of co-occurring insomnia and mental distress in the association between LDD and LBP-related disability.

## Methods:

A total of 1080 individuals who had experienced LBP during the previous year underwent 1.5-T lumbar magnetic resonance imaging, responded to questionnaires, and participated in a clinical examination at the age of 47. Full data was available for 843 individuals. The presence of LBP and LBP-related disability (numerical rating scale, range 0–10) were assessed using a questionnaire. LDD was assessed by a Pfirrmann-based sum score (range 0–15, higher values indicating higher LDD). The role of insomnia (according to the five-item Athens Insomnia Scale) and mental distress (according to the Hopkins Symptom Check List-25) in the association between the LDD sum score and LBP-related disability was analyzed using linear regression with adjustments for sex, smoking, body mass index, education, leisure-time physical activity, occupational physical exposure, Modic changes, and disc herniations.

## Results:

A positive association between LDD and LBP-related disability was observed among those with absence of both mental distress and insomnia (adjusted B=0.132, 95% CI=0.028-0.236, p=0.013), and among those with either isolated mental distress (B=0.236 CI=0.001-0.471, p=0.049) or isolated insomnia (B=0.207, CI=0.040-0.373, p=0.015). However, among individuals with co-occurring insomnia and mental distress, the association was not significant (B=-0.093, CI=-0.346-0.161, p=0.470).

## Conclusions:

LDD does not associate with LBP-related disability when insomnia and mental distress co-occur. This finding may be useful when planning treatment and rehabilitation that aim to reduce disability among individuals with LDD and LBP. Future prospective research is warranted.

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## AIM

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

**Cross-sectional study**

## 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

## 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[1] B (95% CI) (n=843) |
|---|---|---|
| 1. Absence of both mental distress and insomnia (n = 487) | **0.132 (0.044-0.221), p=0.003** | **0.132 (0.028-0.236), p=0.013** (n=456) |
| 2. Isolated mental distress (n=75) | **0.236 (0.001-0.471), p=0.049** | **0.345 (0.039-0.650), p=0.028** (n=68) |
| 3. Isolated insomnia (n=236) | **0.207 (0.068-0.346), p=0.004** | **0.207 (0.040-0.373), p=0.015** (n=212) |
| 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 (n=107) |

1: 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.