The influence of obesity on lower back pain in elderly individuals

Considerations based on medical examination of local residents: the GAINA study

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Background

High body fat induces **lumbar disc degeneration** and **lower back pain (LBP)**

Battie et al. Pain 2007
Videman et al. Spine 2006
Malis et al. Obes Res 2005

There is no association between LBP and body mass index (BMI)

Mails et al. Obes Res 2005
Videman et al. Spine 2006

The association between obesity and LBP is unclear.

Purpose

We report the relationship between obesity and lower back pain based on a medical examination of elderly local residents.

Hino town

Many elderly people work as farmers

Materials and methods

Longitudinal cohort study

125 residents participated in a general medical examination from 2014 to 2017

Male: 45 Female: 80

Mean age: 72.8 years (52–89; median 73.0 y.o.)

Assessment

1) Questionnaire

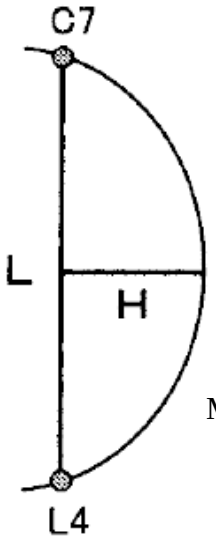
① Presence of LBP
② Oswestry Disability Score (ODI)
③ Visual Analog Scale (VAS)

2) Physical examination

① Body fat percentage
② Kyphosis index
③ Height
④ Body weight
⑤ Bone mineral density (BMD: %YAM)

Physical examination

Kyphosis index
（KI）



H/L × 100

Milne et al. *Annals of Human Biology 1976*

Body fat percentage

Bioelectrical impedance analysis: BIA

TANITA
Body Composition Analyzer
MC-980A

Obesity

Male: more than 25%
Female: more than 30%

Lohman. *Exerc Sport Sci Rev*. 1986

Research 1

The percentage of body fat

Male : more than 25%
Female: more than 30%

Baseline in 2014

Normal group N=89

Obese group N=36

Comparisons of VAS, BMI, and KI in 2014 and 2017 between the two groups

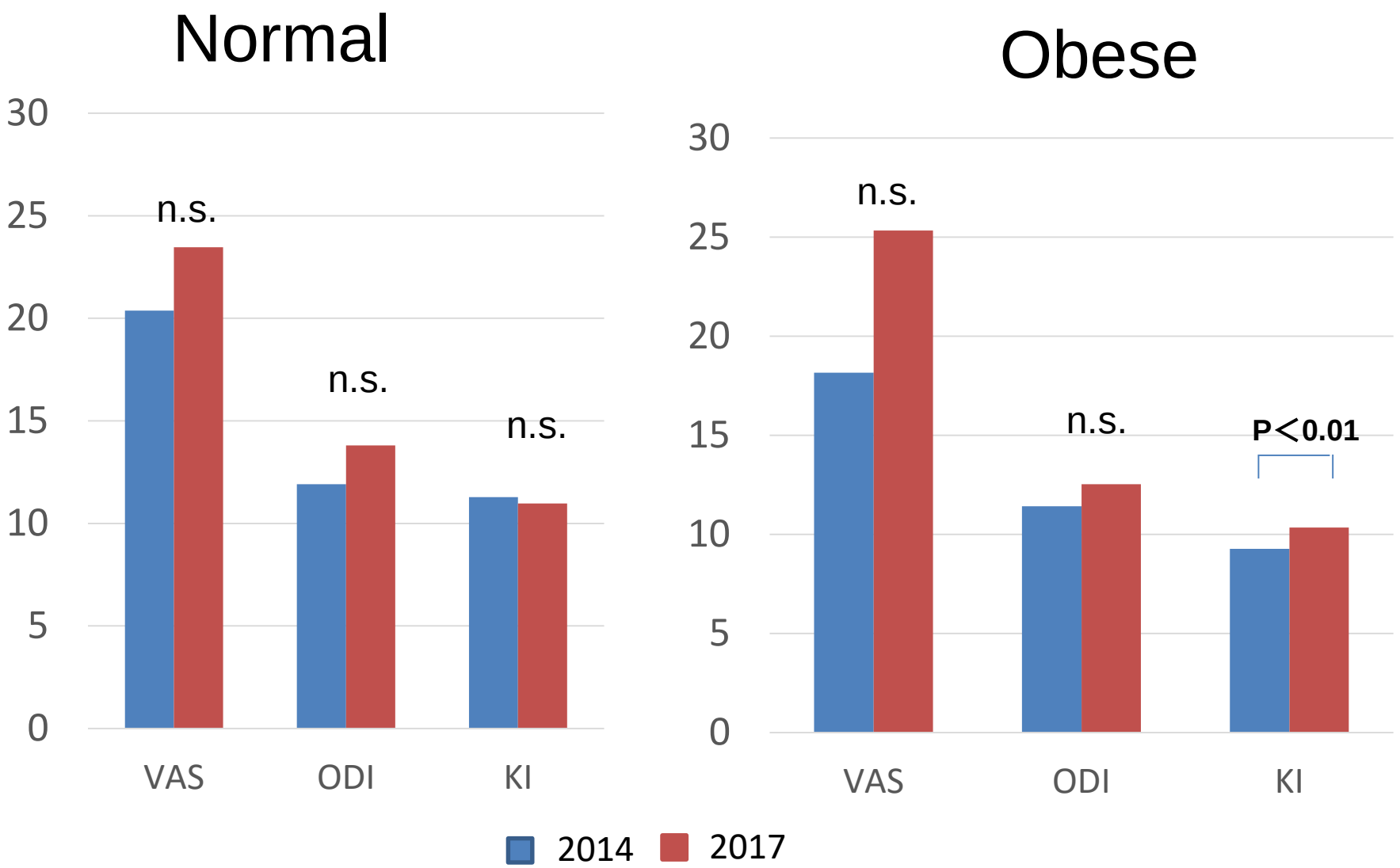
Statistical analysis

Pearson's $\chi 2$ test
paired t-test
Mann–Whitney U-test

Demographics

	Normal (n = 89)	Obese (n = 36)	P value
Age	73.0±7.3	72.4±6.7	0.60
Gender (% female)	56.2	83.3	0.01
Height (cm)	156.1±9.6	153.3±8.3	0.12
Weight (kg)	51.6±9.7	58.3±7.5	0.01
Body fat (%)	20.4±5.1	33.6±4.0	0.01
BMD (%YAM)	79.7±14.5	79.5±10.5	0.85
Smoking (%)	5.6	5.6	0.98
VAS (mm)	20.4±24.5	18.1±22.9	0.35
ODI (%)	11.9±12.4	11.4±11.0	0.94
Kyphosis index	11.3±3.0	9.3±3.4	0.01
Prevalence of LBP (%)	66.3	61.1	0.58

Comparisons of VAS, ODI, and KI between normal and obese groups from 2014 to 2017



No subjects suffered from vertebral fracture in this period.

Research 2

Normal group N=89

2014

Newly obese group

12/89 residents shifted from normal body fat to obesity

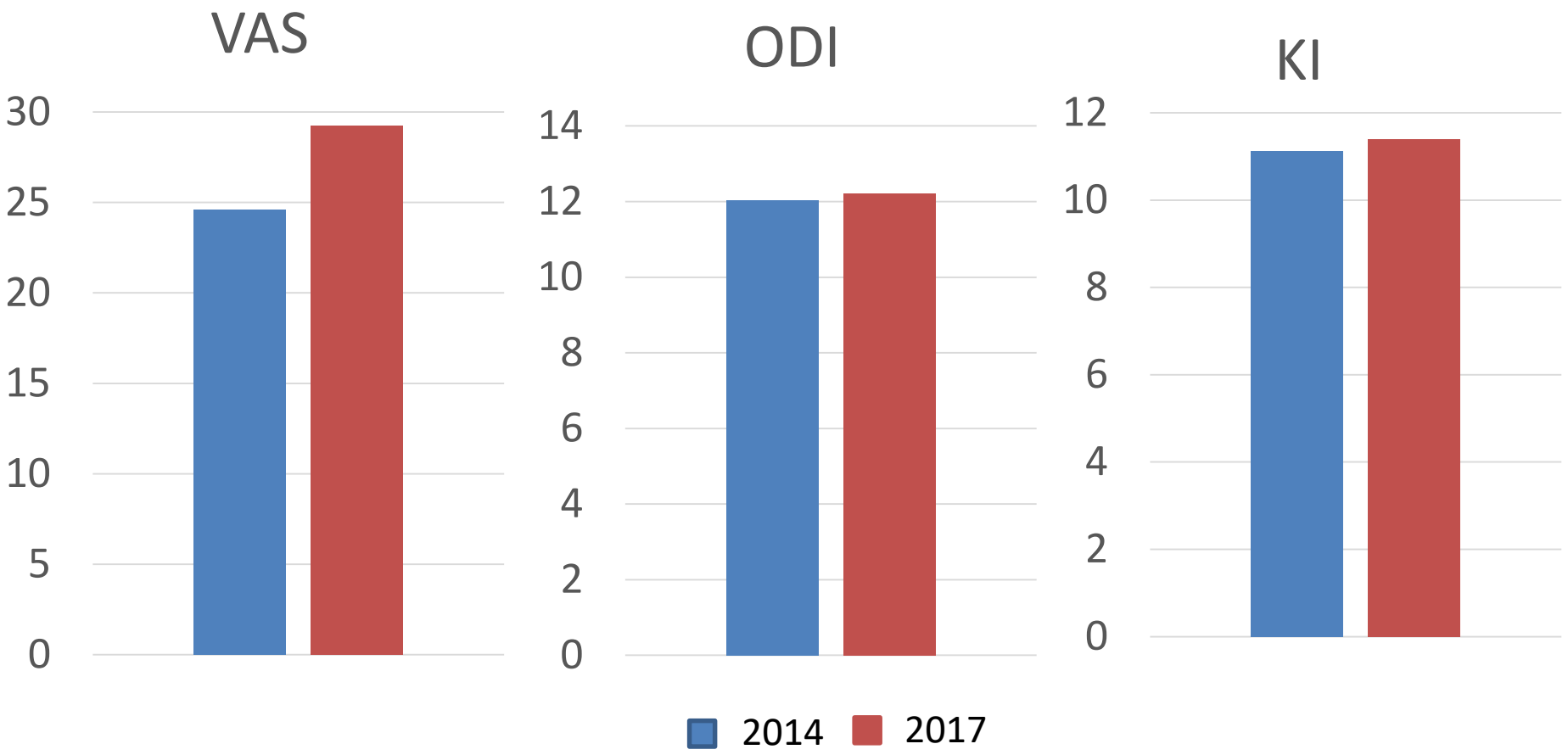
2017

We compared VAS, BMI, and KI between 2014 and 2017 in Newly obese group .

Statistical analysis

Paired t-test

Comparisons of VAS, ODI, and KI between 2014 and 2017 in the newly obese group



There were no significant differences in VAS, ODI, and KI in the newly obese group.

Discussion

The association between LBP and obesity

This study No association between LBP and obesity

✓ There are some reports to indicate that obesity affected LBP

Battie et al. Pain 2007

Lake JK et al. J Clin Epidemiol 2000

✓ The obesity-LBP association is only apparent in cross-sectional studies

Dario et al. Spine J 2015

Our study was longitudinal study

Obesity may not be associated with LBP

The association between spinal alignment and obesity

This study

Kyphosis progressed in the obese group and no subjects suffered vertebral fracture

We considered that kyphosis was caused by disc degeneration

✓ Obesity evokes inflammation of local tissue; inflammatory cytokines affect lumbar disk

✓ Overweight may increase the load on the spine and cause disk degeneration

Liuke et al. Int J Obes. 2005

Obese might progress disc degeneration and affect spinal alignment

Conclusion

Obesity is not a risk factor for lower back pain
However, obesity affects spinal alignment

Disclosure of Conflict of Interest

None of the authors has
any potential conflict of interest