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# Is risk of degenerative musculoskeletal conditions associated with pre-pregnancy body mass index and parity?

## A study within the Danish National Birth Cohort

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### Background

Obesity among women may influence the risk of degenerative musculoskeletal conditions (MSCs) and contribute to poor quality of life.

Parity, which constitutes a sudden natural increase in weight as well it affects long-term body mass index (BMI), may put strain on the musculoskeletal system.

The interplay between pre-pregnancy BMI and parity and the risk of MSC is unknown.

### Aim

We conducted this study to examine how pre-pregnancy BMI and parity were associated with long-term risk of MSCs.

### Methods

From the Danish National Birth Cohort, 79,687 mothers with singleton births were included.

Information on height and weight prior to pregnancy was obtained from telephone interviews and parity from the Danish Medical Birth Registry.

Diagnoses on degenerative MSC including osteoarthritis, disc disorders, low back pain, and soft tissue disorders were obtained from the National Patient Registry.

Hazard ratios (HR) were estimated using Cox regression, adjusting for relevant confounders including maternal age.

The follow-up started at the day of conception.

### Conclusion

High pre-pregnancy BMI increased the occurrence of degenerative MSC in the years following pregnancy and child-birth. In combination with increasing pre-pregnancy BMI, higher parity added

to an already elevated risk. Prevention of maternal overweight may reduce the development of degenerative MSCs among mothers.

### Results

The cumulative incidence of MSCs during a median follow-up of 12.4 years was 19.7%. Risk of MSC increased with both increasing pre-pregnancy BMI and parity. Women, obese prior to conception, had an increased risk of 26% of development of MSCs compared

to a normal-weight woman [95% confidence interval 19-34%]. Compared to normal-weight first time mothers, the highest risk was seen in obese women with >2 parities (HR 1.61 [95% confidence interval 1.41-1.83]).

**TABLE 1:** Hazard ratio (HR) for degenerative musculoskeletal conditions according to pre-pregnancy body mass index in the Danish National Birth Cohort

All degenerative disorders, composite endpoint	
	HR Adjusted ( 95% CI)
Continuous BMI, per 1 BMI unit	1.03 (1.02-1.03)
Underweight	0.84 (0.77-0.92)
Normal-weight	1.00 (Ref.)
Overweight	1.28 (1.22-1.33)
Obese	1.26 (1.19-1.34)

Adjusted for smoking, exercise, and social status in pregnancy, years since start of follow-up, and pregnancy and parity as time dependent variables.

**TABLE 2:** Hazard ratios (HR) for any degenerative musculoskeletal conditions according to pre-pregnancy BMI and parity. Follow-up from conception up till 14 years postpartum in the Danish National Birth Cohort

Pre-pregnancy BMI prior to index birth					
Parity	Underweight (95 % CI)	Normal-weight (95% CI)	Overweight (95% CI)	Obese (95% CI)	Parity (95% CI)**
Parity 1	0.85 (0.74-0.97)	1.00 (ref.)	1.29 (1.21-1.37)	1.22 (1.11-1.33)	1.00 (ref.)
Parity 2	0.94 (0.81-1.09)	1.21 (1.16-1.27)	1.49 (1.39-1.59)	1.58 (1.44-1.74)	1.27 (1.22-1.33)
Parity 3+	1.25 (1.02-1.53)	1.33 (1.25-1.42)	1.75 (1.60-1.92)	1.61 (1.41-1.83)	1.58 (1.47-1.70)
<b>BMI*</b>	0.83 (0.76-0.91)	1.00 (ref.)	1.27 (1.22-1.32)	1.25 (1.18-1.32)	

Adjusted for smoking, exercise, and social status in pregnancy, time since start of follow-up, and age and pregnancy as time dependent variable.

\* Also adjusted for parity.

\*\* Also adjusted for pre-pregnancy BMI.

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