

Physical Activity and the Incidence of Multiple Sclerosis (3210)

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INTRODUCTION

- Research among individuals with multiple sclerosis (MS) and studies of experimental autoimmune encephalomyelitis, an animal model of MS, suggest exercise might modify disease progression.
- Few prior studies have focused on whether physical activity is associated with incident MS.
- In this study, we examined whether physical activity levels during adulthood and early in life are associated with risk of MS.

METHODS

- **Design:** Prospective cohort study
- **Population:** Nurses' Health Study—cohort of 121,701 women started in 1976, women aged 30 to 55 in 1976. Follow-up for these analyses between 1986 (first year activity reported) and 2004.

Nurses' Health Study II—cohort of 116,430 women followed between 1989 and 2009, who were 25 to 42 years old at baseline.
- **Case ascertainment:** Every 2 years, women reporting a diagnosis of MS are asked for permission to contact their neurologists and obtain pertinent information regarding their diagnosis including clinical history, MRI, and CSF test results. During follow-up, 564 women were confirmed as having definite or probable MS.
- **Exposure assessment:**

At baseline, women reported average hours per week spent doing recreational activities. Each activity was assigned a metabolic equivalent score (MET), a measure of energy expenditure. For example, jogging was assigned a score of 7; running, 12. MET-hours per week for individual activities were summed to calculate a total MET-hours per week score.

In NHSII in 1997, women reported hours per week of walking, moderate and strenuous activity from ages 12 to 34, from which total MET-hours per week was derived.

- **Statistical analysis:** Cox proportional hazards models, adjusted for age, ethnicity, latitude of residence at age 15, pack-years of smoking, body mass index at age 18 and supplemental vitamin D intake, were used to estimate rate ratios. Cohort-specific relative rates were pooled using the inverse of the variances as weight. We assessed how physical activity of women with MS (relative to non-cases) changed before and after first MS symptoms and diagnosis.

RESULTS

Table. Selected characteristics of women in NHS and NHSII by total physical activity at baseline*

	Baseline Total Physical Activity (MET-h/week)				
	≤ 2.0	2.1-4.5	4.6-10.3	10.4-21.5	21.6-124.7
NHS					
No. of women	16,181	16,527	16,710	16,715	16,526
Age baseline, mean	53.1	53.2	53.1	53.1	53.1
Residence in North tier at age 15 (%)	40.5	42.1	41.6	42.4	42.5
Scandinavian ancestry (%)	3.3	4.0	4.4	4.8	4.2
Ever smoker at baseline (%)	58.3	55.1	53.9	54.4	56.2
NHSII					
No. of women	22,925	22,405	22,689	22,686	22,668
Age baseline, mean	34.9	34.6	34.5	34.3	33.8
Residence in North tier at age 15 (%)	32.2	33.5	33.7	35	36.4
Scandinavian ancestry (%)	3.9	4.6	4.3	4.6	4.7
Ever smoker at baseline (%)	35.5	34.4	33.9	34.1	35.7

*Each category is directly standardized to the baseline age distribution of the corresponding cohort

Figure 1. Baseline Physical Activity and Rate of MS (NHS and NHSII pooled)

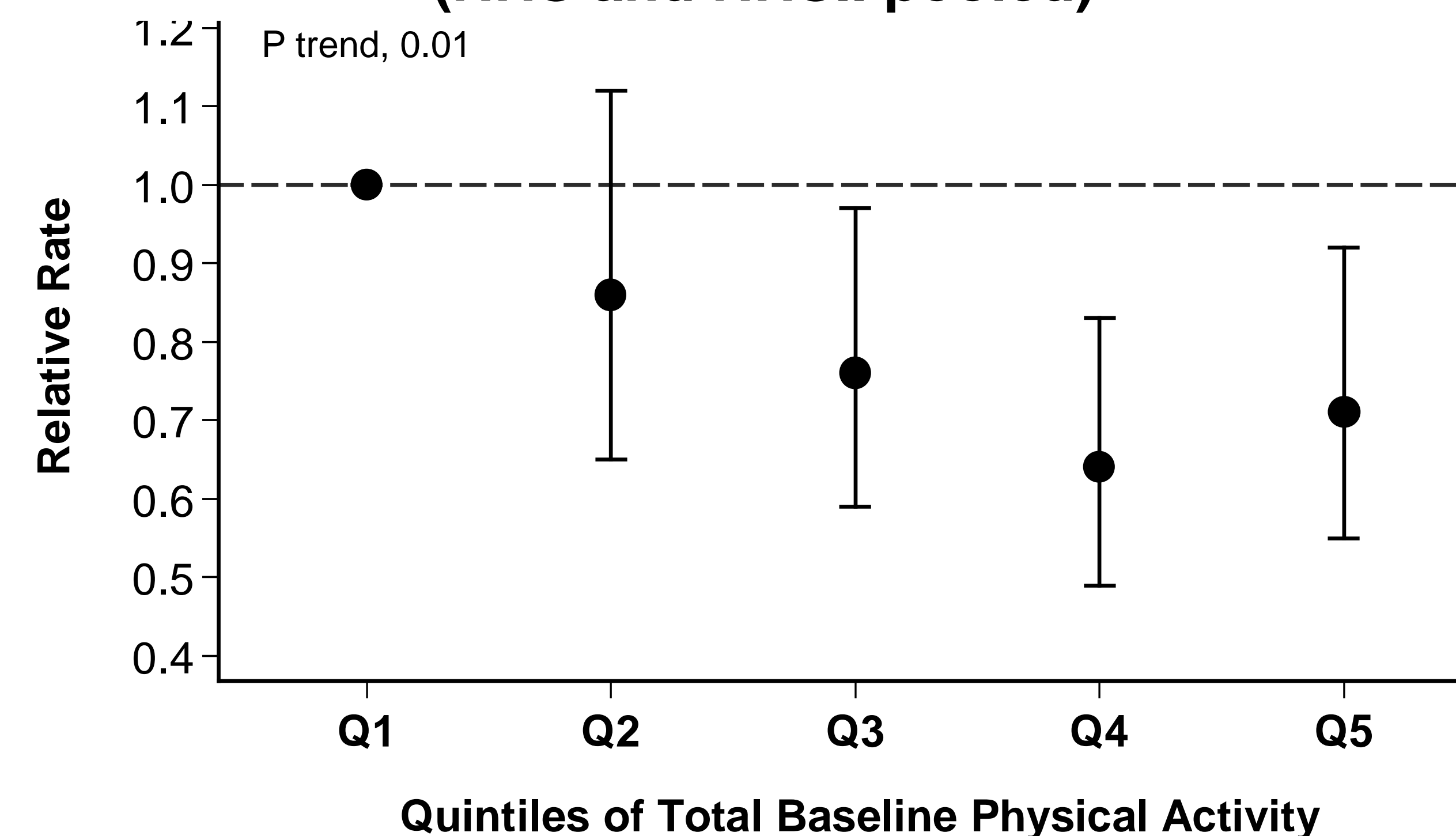
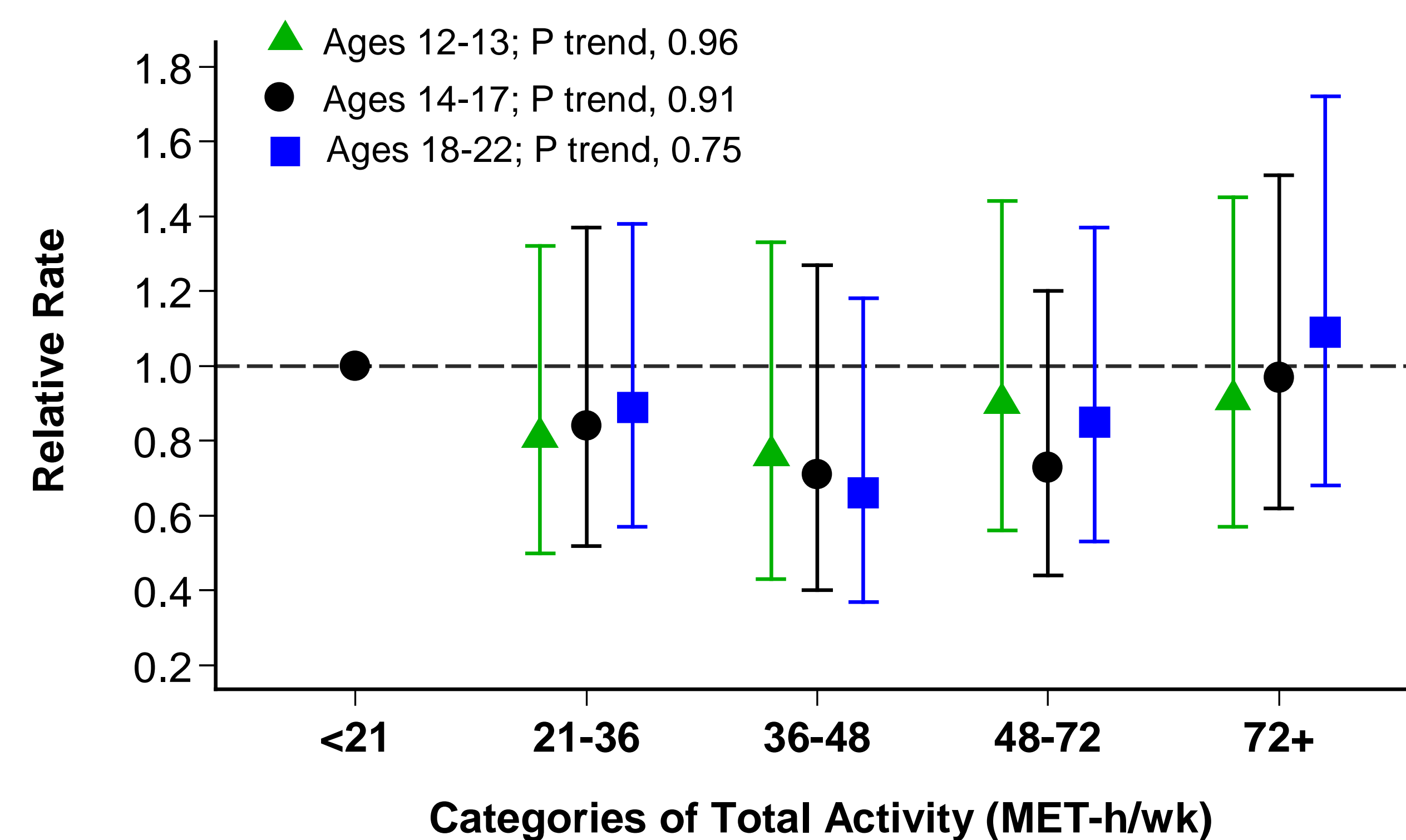


Figure 2. NHSII Early-Life Activity and Rate of MS



RESULTS

Figure 3. Relative physical activity by time of MS diagnosis

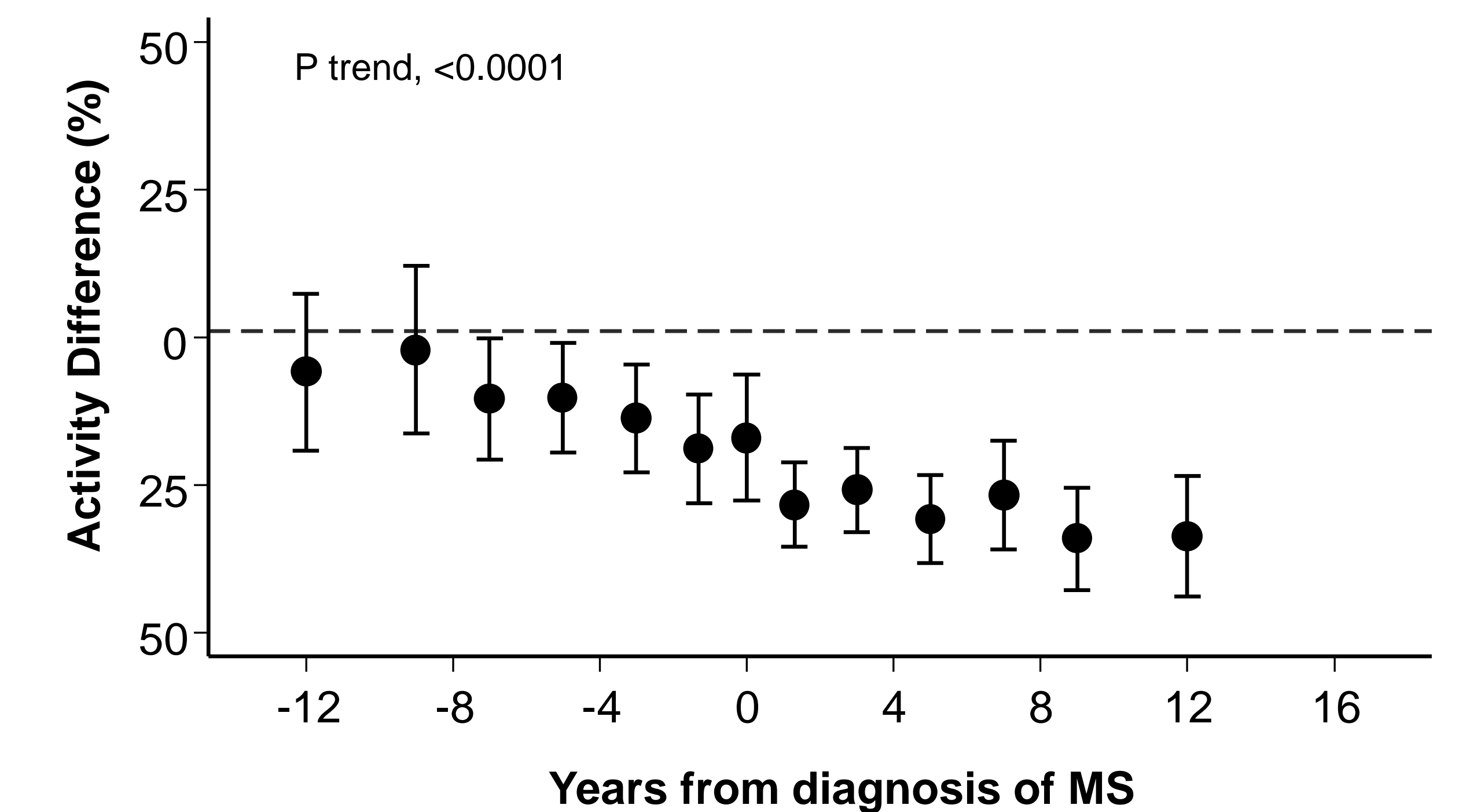
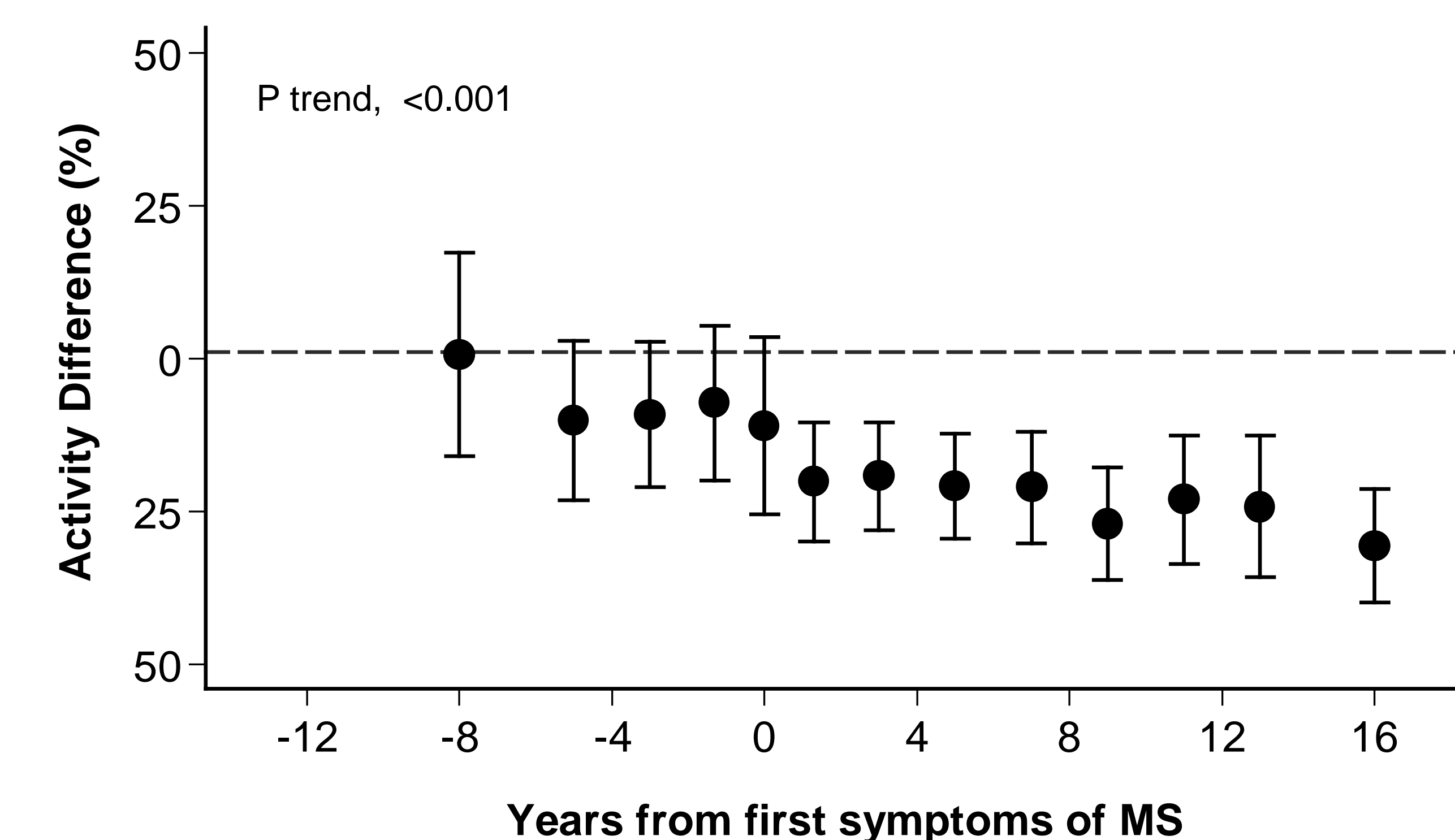


Figure 4. Relative physical activity by time of MS symptoms



CONCLUSIONS

- Baseline activity was associated with a reduced risk of incident MS, but there was no association between early-life activity and MS.
- We cannot rule out the possibility that women change their activity in response to pre-clinical MS.

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