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Short-term changes in bodily pain and associated baseline factors in patients with fibromyalgia receiving paraprobiotic supplementation: a retrospective observational study

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Abstract-

**Background: **
Fibromyalgia is characterized by heterogeneous pain trajectories, and short-term clinical improvement may vary across patients. We explored whether routinely collected baseline clinical variables were associated with short-term bodily pain improvement in a real-world cohort of patients with fibromyalgia receiving paraprobiotic supplementation.
**Methods: **
In this retrospective observational study, 86 women with fibromyalgia receiving paraprobiotic supplementation were followed for 2 months. Bodily Pain (BP) was assessed using the SF-36 at baseline, 1 month, and 2 months. The primary analysis used generalized estimating equations (GEE) with Gaussian family, identity link, and exchangeable working correlation structure, adjusted for age, years since diagnosis, body mass index (BMI), smoking status, hypertension, and dyslipidemia. Sensitivity analyses included alternative GEE working correlation structures, a linear mixed-effects model with patient-specific random intercept, and an ANCOVA model for BP at T2 adjusted for baseline BP.
**Results: **
In the primary analysis, time was significantly associated with SF-36 bodily pain (global Wald p=0.0018). Compared with baseline, BP scores increased non-significantly at T1 (β=1.92, 95% CI-0.39 to 4.23; p=0.103) and significantly at T2 (β=6.95, 95% CI 3.12 to 10.78; p<0.001). The contrast between T2 and T1 was also significant (β=5.03, 95% CI 1.45 to 8.60; p=0.006). Dyslipidemia was independently associated with lower BP scores (β=-4.95, 95% CI-9.71 to -0.19; p=0.041), whereas smoking showed a weaker borderline association. Findings were consistent across sensitivity analyses.
**Conclusion: **
In this exploratory real-world cohort, SF-36 bodily pain scores improved over a two-month follow-up, with the clearest change observed at two months. Dyslipidemia was the factor most consistently associated with lower bodily pain scores across analytic approaches. These findings should be interpreted cautiously given the observational design and absence of a control group, but they support further prospective controlled studies to clarify symptom trajectories and the role of metabolic factors in fibromyalgia.

Index Terms- artificial intelligence, dyslipidemia, fibromyalgia, generalized estimating equations, paraprobiotic supplementation

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