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Abstract

The Effect of Probiotics on the Response to Vaccination in Older Adults: A Systematic Review of Randomised Controlled Trials †

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Abstract: Background: Ageing comes with alterations in many body functions, including the deterioration of the immune system, referred to as immunosenescence. Consequently, older individuals are more vulnerable to infectious diseases. Vaccines are used to stimulate protective immunity, and response to vaccination has been proposed as a measure of immune vigour. Through alterations in gut microbiota, probiotics may improve the immune response in older people. This can be tested by measuring the response to vaccination. Objectives: To evaluate the impact of oral probiotics on the immune response to vaccination in older people. Methods: A systematic review was conducted to determine the effect of probiotics on vaccine responses. A search of the literature was performed in three electronic databases up to January 2023. Eligible papers reporting randomised controlled trials (RCTs) were identified using inclusion/exclusion criteria. The characteristics and outcome data of the included studies were extracted and analysed. The quality of the studies was assessed using the Cochrane Risk of Bias Tool for randomised trials. Results: Ten RCTs, reported in nine papers, were included. A total of 1560 participants aged over 60 years were included in these studies. Nine studies involved the seasonal influenza vaccine, and one involved a COVID-19 vaccine. All studies used lactobacilli, some in combination with bifidobacteria. The studies reported various outcomes including anti-vaccine antibody titres or concentrations, seroconversion, and seroprotection. Some studies reported higher outcomes in participants receiving probiotics compared with placebo. Several studies were at a high risk of bias due to missing outcome data. When comparing antibody titres, the seroprotection rate and seroconversion rate between probiotic and placebo groups were expressed as a response ratio, and the average values were 1.3, 1.41, and 1.92, respectively. Although the results for antibody titres and seroprotection rates suggest that probiotics improve outcomes, they do not provide clear evidence. However, the average seroconversion rate in the probiotic group was almost twice that of the placebo group, suggesting that probiotics are a promising strategy for improving the seroconversion rate following seasonal influenza vaccination. Conclusion: Probiotics (lactobacilli) may improve the vaccine response, but further research is needed to be more certain of this.

Keywords: probiotic; immunity; elderly; vaccine response; systematic review

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