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## A systematic review of probiotic use to improve metabolic health in women

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### Abstract

**Introduction:** There is a substantial body of literature on the use of probiotics in humans. Mostly, this literature examines the use of specific probiotics for treating various acute and chronic health conditions and diseases, (gastrointestinal conditions, respiratory illnesses, metabolic disorders, and atopic diseases) in both adults and children. The sex of the populations in these studies tends to be mixed, while studies that focus on female participants are largely restricted to pregnant populations. It is well established that pre-pregnancy is an important time-point over the life-course, where improvements to the health of the woman may also benefit potential future pregnancies. Furthermore, the route of delivering the probiotic intervention may differ across studies. These modes of delivery include capsules, powdered sachets, yoghurt foods, and fermented milk drinks. There is uncertainty as to the confounding effect of this variability. The objective of this review is to identify the evidence for the effects of probiotic interventions, administered as capsules, on metabolic and immune markers in healthy women of reproductive age.

**Materials and Methods:** The data sources selected were PubMed, MEDLINE, EMBASE, CINAHL, and Web of Science. A grey literature search using controlled vocabulary was performed. PRISMA guidelines were followed, and the Cochrane risk of bias tool was used. Publications were considered for inclusion if they were in English and reported the results of a randomised-controlled trial.

**Results:** Four papers were identified with review relevant outcomes. The reported findings from the included studies did not provide conclusive evidence for the effect of probiotic capsule supplementation in healthy, non-pregnant women.

**Discussion:** Sources of variability are multifaceted in this area. Functional differences occur at the strain level, lowering the specificity of the effects of various bacterial strains across different studies. These factors may reduce the external validity of results across such studies. It is imperative that an evidence base be established in this cohort. This can be achieved with prospectively registered, randomised-controlled trials of sufficient sample size and statistical power.

### Conflict of Interest

There is no conflict of interest