

# Higher Adherence to the Australian Dietary Guidelines Is Associated with Better Mental Health Status among Australian Adult First-Time Mothers



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## ARTICLE INFORMATION

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## ABSTRACT

**Background** Mental health disorders are a leading cause of disability worldwide, including in first-time mothers. Understanding the associations between diet and depressive symptoms could assist in improving mental health status in this group.

**Objective** Our aim was to determine the association between diet quality, fruit, vegetable, and fish consumption and depressive symptoms in first-time mothers aged 19 to 45 years.

**Design** We analyzed cross-sectional, baseline data (3 months postpartum) from the Melbourne InFANT (Infant Feeding, Activity, and Nutrition Trial) Extend Program.

**Participants/setting** Participants were first-time Australian mothers aged 19 to 45 years from the Geelong and Melbourne regions of Victoria, Australia (n=457).

**Main outcome measures** A self-administered, 137-item food frequency questionnaire assessed dietary intake over the past year. Adherence to the 2013 Australian Dietary Guidelines was assessed using the Dietary Guideline Index as a measure of diet quality. Depressive symptoms were determined using the Center for Epidemiologic Studies Depression Scale.

**Statistical analysis performed** Relationships between diet quality, fruit, vegetable, and fish intake and depressive symptoms were investigated using linear regression adjusted for relevant covariates (age, smoking status, sleep quality, education, physical activity status, and body mass index).

**Results** Better diet quality, as indicated by a higher score on the Dietary Guideline Index, was associated with lower depressive symptoms after adjusting for relevant covariates ( $\beta=-.034$ ; 95% CI  $-.056$  to  $-.012$ ). There were no other associations between dietary intake and depressive symptoms.

**Conclusions** Adherence to the Australian Dietary Guidelines was associated with better mental health status among first-time mothers. Further research, including longitudinal and intervention studies, are required to determine causality between dietary intake and depressive symptoms, which might help inform future public health nutrition programs for this target group.

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MENTAL HEALTH DISORDERS ARE A LEADING cause of disability worldwide, with women at particular risk during the postpartum and childbearing years.<sup>1</sup> Globally, the prevalence of depression is approximately 5% in nonpregnant women, 8% to 10% during pregnancy, and up to 13% in the first year postpartum.<sup>2</sup> Furthermore, it is estimated that the prevalence of mental health disorders (bipolar, depression, anxiety) in first-time mothers in Australia is 15% to 25%.<sup>3</sup> In addition, suicide is one of the most common causes of maternal death globally in the first 2 years after birth.<sup>2</sup>

Untreated mental illness hinders mother–infant attachment, breastfeeding, and infant care.<sup>2</sup> Mothers with a mental

illness are also less likely to understand their baby's natural cues for hunger, happiness, or distress, and therefore become less responsive to their baby, which can lead to emotional imbalances in the adolescent years.<sup>2</sup>

Currently, mental health disorders are typically treated with cognitive behavioral therapy and interpersonal therapy in combination with pharmaceutical antidepressant medications.<sup>4</sup> Medications have been suggested in some studies to negatively affect not only the mother, if breastfeeding,<sup>4</sup> but also the newborn, with some negative effects including increased child irritability, crying, and decreased feeding.<sup>4</sup> In addition, some reported side effects of antidepressant medication in women include headache, tremor,

hypotension, anorexia, anxiety, and nervousness.<sup>5</sup> Given these many comorbidities, current research is investigating alternative forms of treatment and strategies for effective prevention of depression, particularly among first-time mothers, due to the high prevalence rates of mental health disorders in this target group.

Healthy dietary behaviors, specifically regular consumption of fruit, vegetables, and fish, have been associated with positive mental health and mood among women and mothers globally.<sup>6-9</sup> It is proposed that these associations are partly due to the long-chain n-3 fatty acid content in fish and antioxidants in fruits and vegetables, which are associated with neurotransmitter production, changes in neurosignaling pathways, and reduced inflammation.<sup>10</sup> Assessment of dietary exposures has traditionally focused on individual foods and nutrients; however, there is a trend in nutrition research toward assessment of the whole diet, including measures of diet quality (eg, dietary index scores), when examining the diet-disease relationship. This quantification of the diet acknowledges that people eat complex combinations of foods containing a mix of macro- and micronutrients, and that balance across the components of the diet can be important.<sup>11,12</sup> Recent research has examined the association between diet quality and risk of depression among adults, reporting an inverse relationship between diet quality and depression.<sup>13</sup> Recent research uses a range of dietary index scores as a measure of diet quality, including but not limited to the Healthy Eating Index, the Mediterranean Diet Score, and the Dietary Guideline Index.<sup>13-15</sup>

Although a small number of studies have investigated the relationship between food consumption during pregnancy and risk of postnatal depression, the association between diet quality in postpartum women and risk of depressive symptoms has not been investigated.<sup>6</sup> In addition, no studies have investigated this relationship in first-time mothers.<sup>6-9</sup> Given that depression is highly prevalent and that associated morbidity is often high, understanding the associations between dietary intake, in particular, fruit, vegetables, and fish intakes, and diet quality and depressive symptoms among first-time mothers is important. This knowledge can inform the development of evidence-based dietary strategies to prevent poor mental health in this target group.<sup>16-18</sup> Therefore, the aim of this study was to determine the association between diet quality, fruit, vegetable, and fish consumption and depressive symptoms in an Australian sample of first time mothers.

## METHODS

### Study Design

This study utilized data obtained from the Melbourne Infant Feeding, Activity and Nutrition Trial (InFANT) Extend, a cluster-randomized controlled trial, with baseline data collected at 3 months postpartum. The InFANT program is a study of the effectiveness of an early childhood obesity-prevention intervention delivered to first-time parents, focusing on parent skills that support development of positive diet and physical activity behaviors in infancy. The InFANT Extend program was conducted within the Melbourne and Geelong regions of Victoria, Australia, and examined the effectiveness of an early childhood obesity-prevention intervention delivered to first-time parents. Participant

recruitment for the InFANT Extend program took place in 2010 and 2011.

### Sample

A two-stage random sampling process was used to recruit 457 first-time parents into the InFANT Extend program. Researchers purposely selected seven Victorian local government areas in the lowest tertile of disadvantage assessed by the group-level variable Socio-Economic Index for Areas within a 75-km radius of the research center (Geelong). Eighty percent of eligible first-time parent groups within each local government area were randomly selected and approached by research staff for recruitment during one of the standard, Maternal and Child Health Nurse new-parent groups. Individual parents were eligible to participate if they gave informed written consent, were first-time parents, and were able to communicate in English. Exclusion criteria included not literate in English, not primiparous, and chronic health conditions in the infant that were likely to influence weight, height, activity, or feeding. When first-time parents' groups declined to participate as a collective, another randomly selected group was approached. Randomization of first-time parent groups (clusters) occurred after recruitment to avoid selection bias. Randomization (stratified by local government area) was conducted by an independent statistician. First-time parents were blinded to allocation and they were not informed of the study aims. Research staff measuring height and weight were not blinded to the intervention status, as they also delivered the intervention. All data entry and analyses were conducted with staff blinded to participant's group allocation.

Ethical approval was received from the Deakin University Human Research Ethics Committee, Health Medicine Nursing and Behavioural Sciences Subcommittee (ID number: EC 175-2007) and by the Victorian Office for Children (reference: CDF/07/1138). InFANT Extend is registered with the Australian Clinical Trials Registry (ACTRN12611000386932).

### Measures

Baseline data were collected from participating mothers at 3 months postpartum through administration of a self-administered questionnaire and anthropometric data collected by a researcher. Data relevant to the current analysis were mothers' dietary intake and diet quality, depressive symptoms, demographic and socioeconomic position details, and lifestyle behaviors, such as physical activity, smoking status, sleep quality, and body mass index (BMI).

### Dietary Intake

Maternal dietary intake was assessed using the Cancer Council of Victoria's validated 137 item semi-quantitative food frequency questionnaire known as the Dietary Questionnaire for Epidemiological Studies (version 3.1).<sup>19</sup> This questionnaire is an updated version of the food frequency questionnaire specifically developed for the Melbourne Collaborative Cohort Study.<sup>19</sup> Mothers were asked to indicate how often they had consumed each food or beverage item during the preceding 12 months, with options ranging from "never," "1 to 3 times per month," "1 to 6 times per week," to "1 to 3 times per day." Finally, the Dietary Questionnaire for

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