Diet and Depression in Community-Dwelling Adults

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M Clin Epid

Thesis submitted for the degree of PhD
(Community Medicine and Clinical Epidemiology)

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School of Medicine and Public Health
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Synopsis

Depression is a highly prevalent mental health disorder that causes severe disability to the individual and results in substantial economic burden. Although depression can be reliably diagnosed and treated, total remission is rarely achieved, and relapses and recurrences are common. Current pharmacological treatments are limited in that they are often associated with severe side effects. Psychological treatments though effective have been shown to be rather costly and require time and commitment. Thus, it is necessary to expand current research to develop universal interventions in relation to mental health promotion, prevention and early intervention in addition to treatment delivery.

An emerging body of evidence has suggested that nutrition plays an important role in mental health. Earlier research on single nutrients or foods and depression has shown that omega-3 fatty acids or fish, folate, vitamin E or zinc may be associated with a reduced risk of depression. Recent epidemiological evidence suggests that consumption of a healthy dietary pattern may be beneficial for preventing depression. This thesis explores the association of overall diet and depression by pooling together current evidence in a meta-analysis and explore primary cohort data to fill some of the gaps in current literature.

Chapter 1 describes the rationale and aims of this research, and provides an overview of the thesis structure linking the published papers to the thesis. The meta-analysis described in Chapter 2 provides a summary of current literature examining the association of overall diet and depression, and synthesised study results using statistical methods. This chapter demonstrated that high intakes of fruits, vegetables, fish and wholegrains are associated with reduced odds of depression (OR = 0.84; 95% CI: 0.76, 0.92; P<0.001). However, this finding was largely based on cross-sectional evidence. Thus, the primary research conducted as part of this thesis aims to provide longitudinal evidence supporting the diet-depression relationship.

Chapter 3 presents a brief description of the cohort datasets used for subsequent chapters of this thesis (i.e. Chapters 5-7). Chapter 4 describes the validation study of the food frequency questionnaire used in one of the cohort study (Hunter Community Study) from which the data for Chapter 7 was derived. This chapter confirms that the food frequency questionnaire was able to reasonably rank study participants according to their carotenoids and Vitamin E intakes.
(≥68% of individuals were correctly classified within the same or adjacent quartile), thus Chapter 7 can rely on the dietary data as being accurate.

Chapters 5 and 6 examine the temporal association between diet quality and odds of depression: whether higher diet quality is associated with reduced odds of incident depression; and whether changes in diet quality are associated with changes in depressive symptoms. Chapter 5 found that high diet quality was associated with lower odds of incident depression (OR: 0.94, 95% CI: 0.83, 1.00, \( P=0.049 \)). Likewise, women who maintained high diet quality over six years had 14% reduced odds of depression compared to women who consistently had poor diet quality (OR: 0.86; 95% CI: 0.77, 0.96; \( P=0.01 \)). However, Chapter 6 showed no association between diet quality and depressive symptoms. It could be that a dietary effect may not be detectable for sub-clinical depression or depressive symptoms, or comparing between extreme groups of diet quality in Chapter 5 allowed an effect to be detected due to the high between-subject variability in adherence.

Chapter 7 explores whether the inflammatory pathway underlie the association between dietary intakes and depression. Specifically, this chapter examine the association between antioxidants and fatty acids intakes and depression, and determine if inflammatory markers – interleukin-6 and C-reactive protein mediate the associations observed between these nutrients and depression. Results from this chapter support the hypothesis that inflammation is one of the factors driving the diet-depression relationship, but it may only be a small contributor as mediation by inflammatory markers only explained at most 7% of the relationship between dietary factors and depressive symptoms.

This thesis ends with Chapter 8 summarising the main study findings, strengths and limitations of each chapter, and detailing the implications for future research exploring the association between overall diet and depression. In conclusion, this thesis contributes to existing knowledge that a causal relationship between diet and depression is plausible, by summarising current evidence on overall diet and depression, demonstrating through primary research that high diet quality may reduce incident depression, and elucidating the mediation effects of inflammatory markers in the diet-depression relationship. The associations observed between diet and depression from this research is modest in magnitude, which is the case for most studies on
diet and disease. This body of work highlights the need for further research that employs longitudinal analyses and randomised controlled trials to clarify whether diet is truly a causal risk factor for depression. If so, even a modest magnitude of effect would have important implications at the population level.