Depression and diet: comparing three dietary pattern methods using cross-sectional data on 56,485 UK Biobank participants

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Dietary pattern analysis is a recent development in diet and depression research[1], yet there are limited studies that investigate the internal validity and potential strengths and weaknesses of the methods[2]. This study aimed to explore the association between diet and depression with three commonly employed methods of dietary pattern analysis within the field of diet and depression: Dietary Inflammatory Index (DII), Healthy Diet Indicator (HDI) and factor analysis (FA).

This cross-sectional study included 56,816 UK Biobank participants aged 40-69 years with complete data on outcome and exposures. Dietary data were collected with a repeat 24-hour recall questionnaire and validated 30-item food frequency questionnaire. Probable lifetime history of major depression was defined using a set of diagnostic criteria. Spearmans correlation coefficient measured agreement between the dietary patterns. Multiple logistic regression was used to estimate the association of diet and depression, with the dietary patterns modelled as quintiles (Q) (Q1- lowest adherence to Q5- greatest adherence). Results were adjusted for a range of socioeconomic, behavioural and health outcomes, and energy.

Healthy dietary pattern derived by FA and DII pattern were most similar. They were strongly correlated (r= 0.67), whilst the HDI was weakly correlated with DII (r= 0.21) or with the healthy pattern (r= 0.35). Furthermore, the odds of depression reduced as adherence increased except in extreme quintiles, whilst the HDI was significant in quintile 4 only. The effect size of the DII and healthy patterns were also similar.

	HDI OR (95 % CI)	DII OR (95 % CI)	Healthy OR (95 % CI)
Quintile 2	0.96 (0.91, 1.03)	0.92 (0.85, 0.99)	0.93 (0.87, 0.99)
Quintile 3	0.96 (0.91, 1.03)	0.90 (0.84, 0.97)	0.91 (0.85, 0.98)
Quintile 4	0.93 (0.87, 0.99)	0.91 (0.85, 0.97)	0.93 (0.87, 1.01)
Quintile 5	1.03 (0.96, 1.09)	0.97 (0.91, 1.04)	0.99 (0.91, 1.08)
p-value	0.057	0.013[a]	0.026[a]

[a] p-value is significant at <0.05

The difference in results from the HDI compared against the DII and healthy patterns results were substantial enough to alter the conclusion drawn. The differences may reflect the underlying dietary construct measured. Although the DII and healthy patterns appeared to be generally healthy they contain a small proportion of unhealthy foods, conversely, HDI measured the optimal diet. Furthermore, there was some evidence the HDI may be a less sensitive measure. Hence, DII and healthy patterns showed better agreement whilst HDI did not.

Results confirm healthier diets are associated with a lower odds of depression[3] however, although the DII and healthy pattern demonstrated better agreement, the lack of association between depression and diet assessed by HDI highlights there is potential for findings to vary depending on the method used. Further research should continue to explore and refine dietary pattern methods in order to develop valid and reliable methods within the field of diet and depression.

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2. Reedy J, Subar AF, George SM *et al.* (2018) *Nutrients* **10**, 5.
3. Molendijk M, Molero P, Ortuno *et al.* (2018) *J of Affect Disorders* **226**, 346–54.