**Abstract Title:** Nutrition interventions for Mental Health Outcomes in Individuals with Diabetes Mellitus (DM): A Systematic Review and Meta-Analysis of Randomised Controlled Trials (RCTs)

**Aim**: To synthesise current literature from RCTs investigating the effectiveness of dietary interventions on depression, anxiety, stress and/or diabetes distress outcomes in individuals with DM.

**Methods:** Six online databases were searched between 2000-2024. Included studies were conducted in adult populations, aged 18 or above, with Type 1 or Type 2 DM, investigating dietary interventions and its impact on mental health outcomes (depression, anxiety, stress and/or DM distress). Random effects meta-analyses were undertaken for mental health outcomes.

**Results:** A total of 30 publications met inclusion criteria, all involving participants with Type 2 DM; one including both Type 1 and Type 2 DM, but none focused solely on Type 1 DM. The most common interventions were dietary supplements (n = 17, 57%) and altered macronutrient intakes (n = 5, 17%). Most studies assessed depression (n = 26, 87%) and anxiety (n=14, 46%), with fewer examining stress (n = 7, 23%) and diabetes distress (n = 8, 27%). Meta-analyses suggest dietary supplementation, specifically co-supplementation including magnesium + zinc, vitamin D3 + probiotic, selenium + probiotic and single agents including saffron powder and Melissa officinalis, may improve depression (Beck Depression Inventory: WMD = -3.13; 95% CI: -5.09, -1.17) and anxiety (Beck Anxiety Inventory: WMD = -1.30; 95% CI: -2.08, -0.52) but not stress. Results varied by assessment tool; for example, with the Depression, Anxiety, Stress Scale-21 tool, anxiety improvements remained significant, however depression scores did not. Altered macronutrient intake, specifically lower carbohydrate diets, significantly improved diabetes-distress (Problem Areas in Diabetes = WMD: -4.20; 95% CI: -8.18, -0.22).

**Conclusion:** While some supplements and lower-carbohydrate diets show promise for improving mental health in people with diabetes, findings are based on limited studies. More RCTs are needed, particularly in those with Type 1 DM and involving whole-diet interventions.