

# A SYSTEMATIC REVIEW OF NON-PHARMACOLOGICAL INTERVENTIONS TO PROMOTE ADHERENCE TO DIETARY SALT AND FLUID RESTRICTION IN END-STAGE KIDNEY DISEASE

Michelle M.Y. Wong<sup>1</sup>, Jonathan C. Craig<sup>2</sup>, Adeera Levin<sup>3</sup>, Giovanni F. M. Strippoli<sup>4,5</sup>, Vanessa C. Gray<sup>6</sup>, Suetonia C. Palmer<sup>6</sup>

<sup>1</sup>University of British Columbia, Department of Medicine, Vancouver, BC, CANADA, <sup>2</sup>The University of Sydney, Sydney School of Public Health, Sydney, AUSTRALIA, <sup>3</sup>University of British Columbia, Division of Nephrology, Vancouver, BC, CANADA, <sup>4</sup>University of Bari, Department of Emergency and Organ Transplantation, Bari, ITALY, <sup>5</sup>Diaverum, Medical Scientific Office, Lund, SWEDEN, <sup>6</sup>University of Otago Christchurch, Department of Medicine, Christchurch, NEW ZEALAND



## Background

Dietary restriction of salt and fluid intake is an important strategy to prevent volume overload, a common complication in end-stage kidney disease. However, dietary restrictions represent an intense burden for patients with chronic kidney disease (CKD).<sup>1</sup> The aim of this systematic review was to assess the effects of non-pharmacological interventions to improve adherence to dietary salt and fluid intake restrictions in adults with stage 5 CKD, including pre-dialysis patients and those treated with chronic haemodialysis (HD) or peritoneal dialysis (PD).

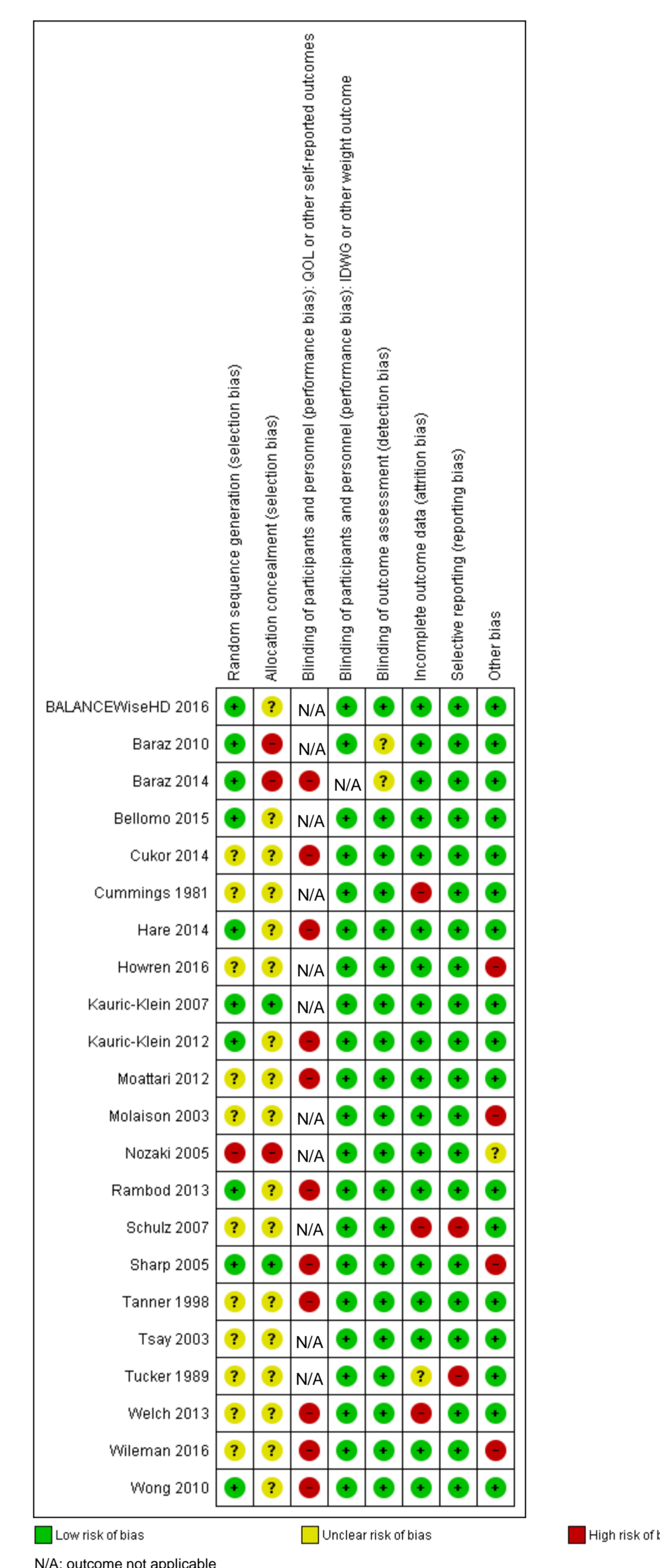
## Methods

- We performed a Cochrane systematic review with meta-analysis using standard Cochrane methods. We searched the Cochrane Renal Group's Specialized Register without language restriction to 23 February 2017 using search terms relevant to this review. We included randomized controlled trials (RCTs) and quasi-RCTs comparing non-pharmacological interventions with routine care or another intervention.
- Data were abstracted by two investigators independently onto a standard form and subsequently entered into Review Manager. Mean differences (MD) for continuous data were calculated with 95% confidence intervals (95% CI) and pooled using random effects meta-analysis. Risk of bias was assessed using the Cochrane Risk of Bias Tool.
- Primary outcomes were mortality, cardiovascular events, and quality of life (QOL).
- Secondary outcomes were volume metrics including interdialytic weight gain (IDWG); intradialytic hypotension; blood pressure (BP); left ventricular hypertrophy (LVH); and nutritional indicators.

## Results

- The search identified 22 included studies (20 HD studies, N=1,818 participants; 2 PD studies, N=135 participants) comparing educational, behavioural, cognitive, or organisational interventions versus routine care or other intervention. Follow-up ranged from 4 to 52 weeks. No studies in non-dialysis stage 5 CKD met inclusion criteria.
- The risk of selection bias was unclear for most studies. Because no participants were blinded, there was high risk of bias for QOL outcome assessment. IDWG outcome had low risk of bias (Figure 1).
- There were no data for all-cause mortality, cardiovascular events, intradialytic hypotension, LVH, or nutritional indicators.
- Compared to routine care, interventions did not demonstrate differences in SF-36 subscale scores, except physical role scores (MD 12.29, 5.04 to 19.54). This represents very low certainty evidence due to imprecision and high risk of bias.
- Among HD studies, there was moderate certainty evidence that interventions have little effect on IDWG (MD -0.12 kg, -0.25 to 0.01) (Figure 2). Behavioural interventions demonstrated a small reduction in IDWG. Sensitivity analysis excluding cluster-randomized studies showed similar results. Compared to routine care, interventions demonstrated lower end-of-study pre-HD BP (-7.72 mmHg, 95% CI -12.88 to -2.57 for systolic BP, and -4.12 mmHg, -7.91 to -0.32 for diastolic BP), with greater magnitude of effect with behavioural interventions than organisational interventions (low certainty evidence).
- Among the PD studies, there was insufficient evidence to make conclusions about the effect of interventions on fluid adherence, body weight and BP.

Figure 1. Risk of bias for included studies



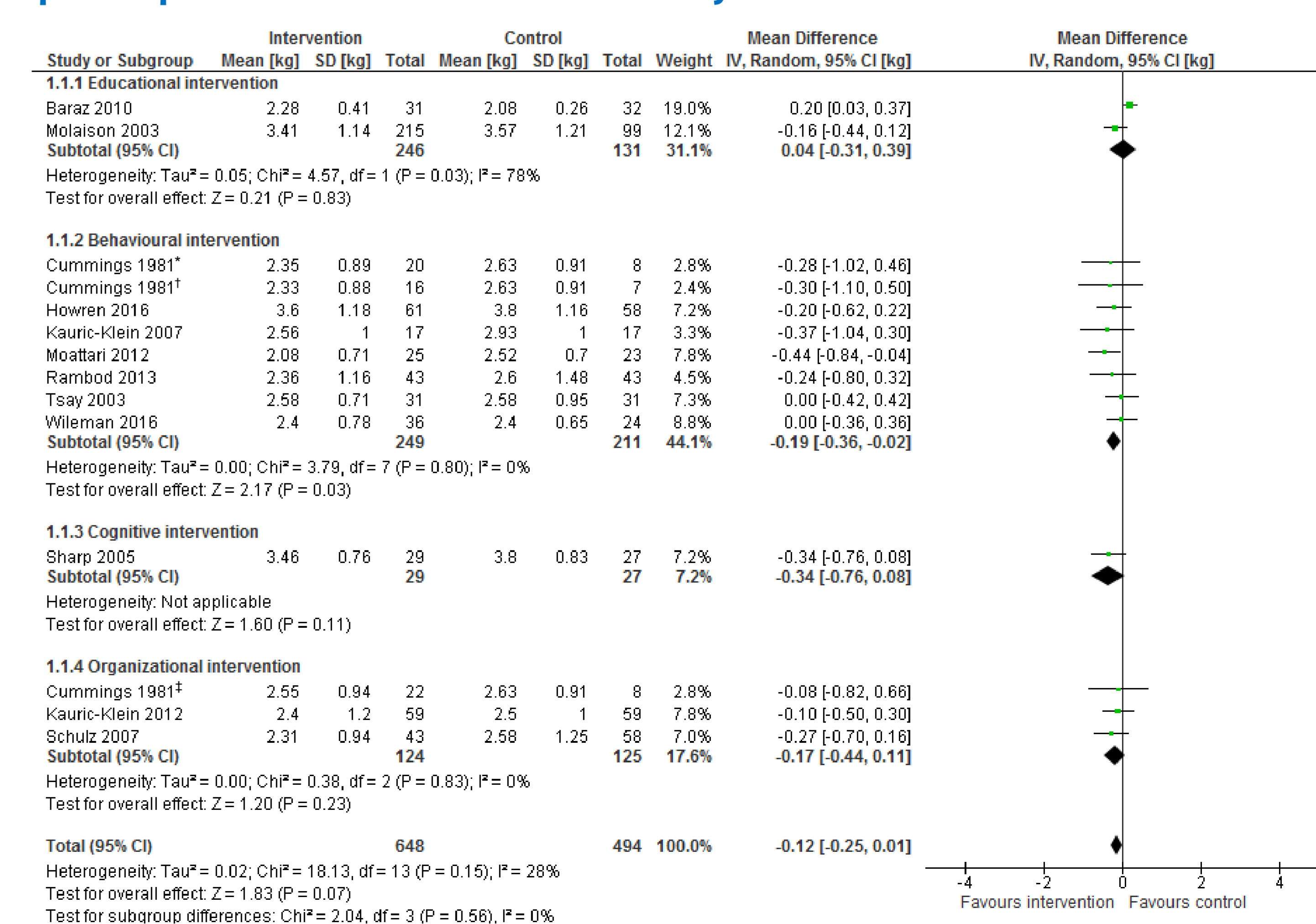
## Summary of Findings

All interventions for promoting adherence to fluid intake and dietary salt restriction compared with routine care

**Patient or population:** Participants with end stage kidney disease on haemodialysis or peritoneal dialysis  
**Intervention:** All interventions (educational, cognitive, behavioural and organizational)  
**Comparison:** Routine care

Outcomes	Illustrative comparative risks (95% CI)	Mean difference (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk			
	Control/routine care	All interventions			
Mortality	See comment	See comment	Not estimable	0	See comment
Cardiovascular events	See comment	See comment	Not estimable	0	No studies provided data for this outcome.
Quality of life, SF-36 physical function subscale (from 0, poorest, to 100, best)	Mean SF-36 physical function score ranged across control groups from 42.41 to 70.15.	Mean SF-36 physical function score was on average 6.15 higher (95% CI: -4.99 to +17.28)	MD 6.15 higher (4.99 lower to 17.28 higher)	161 (2 studies: 1 educational; 1 cognitive)	Low (High risk of bias from lack of blinding; imprecision present)
IDWG, kg	Mean IDWG ranged across control groups from 2.08 to 3.80 kg	Mean IDWG in the intervention groups was on average 0.12 kg lower (95% CI: -0.25 to +0.01)	MD 0.12 kg lower (0.25 lower to 0.01 higher)	1,142 (12 HD studies: 2 educational; 7 behavioural; 3 cognitive; 3 organizational)	Moderate
Intradialytic hypotension events	See comment	See comment	Not estimable	0	No studies provided data for this outcome.
Systolic blood pressure, mm Hg	Mean SBP ranged across control groups from 119.6 to 161.0 mm Hg	Mean SBP in the intervention groups was on average 4.61 mm Hg lower (95% CI: -11.66 to +2.44)	MD 4.61 mm Hg lower (11.66 lower to 2.44 higher)	316 (4 HD studies & 1 PD study; 2 behavioural; 1 cognitive; 2 organizational)	Low (Imprecision/inconsistency present)
Diastolic blood pressure, mm Hg	Mean DBP ranged across control groups from 66.4 to 97.0 mm Hg	Mean DBP in the intervention groups was on average 1.69 mm Hg lower (95% CI: -6.7 to +3.31)	MD 1.69 mm Hg lower (6.7 lower to 3.31 higher)	316 (4 HD studies & 1 PD study; 2 behavioural; 1 cognitive; 2 organizational)	Low (Imprecision/inconsistency present)

Figure 2. Interdialytic weight gain (kg) at end of study among participants treated with haemodialysis



**Notes:** Cummings 1981 had 3 active treatment arms: behaviour contract with patient\*; behaviour contract with patient's family or friend†; telephone calls from nurses‡. For each comparison, the number of participants in the control arm was adjusted by dividing total N in control group by 3. Baraz 2010 compared 2 educational strategies: video education vs. oral education (categorized as control group in this analysis).

## Conclusion

Behavioural interventions demonstrated a small benefit in IDWG but evidence regarding other outcomes is sparse and therefore of low certainty. RCTs assessing important clinical outcomes, such as cardiovascular events, were lacking. More RCTs in PD and non-dialysis stage 5 CKD are needed.

**References:**  
 1. Palmer SC, Hanson CS, Craig JC, et al. Dietary and fluid restrictions in CKD: a thematic synthesis of patient views from qualitative studies. *Am J Kidney Dis* 2015; 65(4): 559-573.

Further information: [michellemywong@gmail.com](mailto:michellemywong@gmail.com)  
<http://kidneyandtransplant.cochrane.org/>  
 @CochraneKidney