**Supplementary Online Content**

**Contents**

Appendix A. Search String 3

Appendix B. Reference list of included studies 5

Appendix C. Bayesian MCMC chain trajectory map and density map 10

1 BMI 10

2 ALB 11

2 HB 12

Appendix D. Iterative convergence Brooks - Gelman - Rubin diagnostic graph 12

1 BMI 12

2 ALB 13

2 HB 13

Appendix E. Assessment of Inconsistency 13

Appendix F. Assessment of Model fit 14

Appendix G. Results of the network rank test (SUCRA) 15

Appendix H. Probability plot ranking of different interventions on outcome indicators 16

1 BMI 16

2 ALB 17

3 HB 18

Appendix I. Comparison-adjusted funnel plots 19

1 BMI 19

2 ALB 20

3 HB 21

Appendix J. Sensitivity Analyses for Outcomes 22

Appendix K. GRADE Ratings for All Contrasts 24

1 BMI 24

2 ALB 24

3 HB 25

***Appendix A. Search String***

Take PubMed as an example. The following keywords and Medical Subject Headings (MESH) will be used for searching articles:

|  |  |
| --- | --- |
| #1 | (((((((((((((((Renal Dialysis[MeSH Terms]) OR (Hemodialysis[Title/Abstract])) OR (Hemodialyses[Title/Abstract])) OR (Extracorporeal Dialyses[Title/Abstract])) OR (Extracorporeal Dialysis[Title/Abstract])) OR (maintenance hemodialysis[Title/Abstract])) OR (Dialysis[MeSH Terms])) OR (Dialyses[Title/Abstract])) OR (Hemoperfusion[MeSH Terms])) OR (Hemosorption[Title/Abstract])) OR (Kidney Failure, Chronic[MeSH Terms])) OR (End-Stage Kidney Disease[Title/Abstract])) OR (End-Stage Renal Disease[Title/Abstract])) OR (End-Stage Renal Failure[Title/Abstract])) OR (Renal Failure, Chronic[Title/Abstract])) OR (ESRD[Title/Abstract]) |
| #2 | ((((((((((((((((((Exercise[MeSH Terms]) OR (Physical Activity[Title/Abstract])) OR (Physical Activities[Title/Abstract])) OR (Physical Exercise[Title/Abstract])) OR (Acute Exercise[Title/Abstract])) OR (Isometric Exercises[Title/Abstract])) OR (Aerobic Exercise[Title/Abstract])) OR (Exercise Trainings[Title/Abstract])) OR (Psychology[MeSH Terms])) OR (Psychological Side Effect[Title/Abstract])) OR (Psychosocial Factor[Title/Abstract])) OR (Psychologist[Title/Abstract])) OR (diet[MeSH Terms])) OR (diets[Title/Abstract])) OR (dietary[Title/Abstract])) OR (Health Education[MeSH Terms])) OR (Community Health Education[Title/Abstract])) OR (oral nutritional supplement[Title/Abstract])) OR (ONS[Title/Abstract]) |
| #3 | (((((((Nutritional Status[MeSH Terms]) ) OR (Nutrition Status[Title/Abstract])) OR (Malnutrition[MeSH Terms])) OR (Nutritional Deficiency[Title/Abstract])) OR (Nutritional Deficiencies[Title/Abstract])) OR (Undernutrition[Title/Abstract])) OR (Malnourishment[Title/Abstract]) |
| #4 | #1 AND #2 AND #3 |

Take CNKI as an example, the following keywords and Medical Subject Headings (MESH) will be used for searching articles:

SU: maintenance hemodialysis OR hemodialysis OR renal dialysis OR blood dialysis OR Hemoperfusion OR End-stage renal disease

SU: exercise OR psychology OR diet OR health education OR oral nutritional supplements Search in results

SU: nutrition OR nutritional status OR malnutrition OR nutritional deficiency retrieved Search in results

***Appendix B.*** ***Reference list of included studies***

1. Wei 2020
* Wei, Q., 2020. Observation on the effect of exercise therapy with nursing intervention on the nutritional status and quality of life of patients on maintenance hemodialysis. World Latest Medicine Information 20 (7), 297-298.
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* Zhou, R., Zhou, P., Li, Q., Zheng, J., Li, Y., Li, J., Wen, N., Liao, L., 2016. Effect of nursing intervention combined with exercise therapy on the quality of life of hemodialysis patients. Guangxi Medical Journal 38 (01), 134-136+139.
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* Li, J., Tu, E., Guo, Y., Liu, P., 2008. Application of nutrition guidance in maintenance of hemodialysis patients Chinese Journal of Modern Nursing 14 (11), 1248-1250.
1. Lu 2022
* Lu, M., 2022. A study on the nutritional status of MHD patients with traditional Chinese medicine behavioral intervention and health management. Liaoning University of Traditional Chinese Medicine.
1. Abreu et al. 2017
* Abreu, C.C., Cardozo, L., Stockler-Pinto, M.B., Esgalhado, M., Barboza, J.E., Frauches, R., Mafra, D., 2017. Does resistance exercise performed during dialysis modulate Nrf2 and NF-κB in patients with chronic kidney disease? Life Sci 188, 192-197.
1. Wang et al. 2019
* Wang, X., Zhang, K., Ge, Y., Wang, A., Yu, C., 2019. Effects of intradialytic exercise on inflammation, oxidative stress and endothelial function in patients with maintenance hemodialysis Chinese Journal of Blood Purification 18 (6), 390-393.
1. Afshar et al. 2010
* Afshar, R., Shegarfy, L., Shavandi, N., Sanavi, S., 2010. Effects of aerobic exercise and resistance training on lipid profiles and inflammation status in patients on maintenance hemodialysis. Indian J Nephrol 20 (4), 185-189.
1. Dai et al 2022
* Dai, S., Ma, Y., 2021. Effect of intradialytic progressive resistance training on nutritional status and body composition in maintenance hemodialysis patients. Chinese Journal of Nephrology 37 (5), 434-437.
1. Yan et al. 2022
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2. Leng 2012
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3. Wang et al. 2021
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4. Wilund et al. 2010
	* Wilund, K.R., Tomayko, E.J., Wu, P.T., Ryong Chung, H., Vallurupalli, S., Lakshminarayanan, B., Fernhall, B., 2010. Intradialytic exercise training reduces oxidative stress and epicardial fat: a pilot study. Nephrol Dial Transplant 25 (8), 2695-27
5. Su et al. 2022
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8. Jeong et al. 2019
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	* Martin-Alemañy, G., Espinosa-Cuevas, M., Pérez-Navarro, M., Wilund, K.R., Miranda-Alatriste, P., Cortés-Pérez, M., García-Villalobos, G., Gómez-Guerrero, I., Cantú-Quintanilla, G., Ramírez-Mendoza, M., Valdez-Ortiz, R., 2020. Effect of Oral Nutritional Supplementation With and Without Exercise on Nutritional Status and Physical Function of Adult Hemodialysis Patients: A Parallel Controlled Clinical Trial (AVANTE-HEMO Study). J Ren Nutr 30 (2), 126-136.
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# ***Appendix C. Bayesian MCMC chain trajectory map and density map***

## *1 BMI*


## *2 ALB*


## *3 HB*


# ***Appendix D. Iterative convergence Brooks - Gelman - Rubin diagnostic graph***

## *1 BMI*



## *2. ALB*


## *3 HB*


# ***Appendix E. Assessment of Inconsistency***

## *1 BMI*

|  |  |  |
| --- | --- | --- |
| comparison | p.value | CrI |
| d. H. I | 0.22 | -- |
| direct | -- | 1.1 (-2.0, 4.2) |
| indirect | -- | -3.1 (-9.1, 2.9) |
| network | -- | 0.66 (-2.1, 3.2) |
| d. H. N | 0.79 |  |
| direct | -- | -1.6 (-6.4, 3.2) |
| indirect | -- | -0.88 (-3.4, 1.7) |
| network | -- | -1.2 (-3.3, 1.0) |

## *2 ALB*

|  |  |  |
| --- | --- | --- |
| comparison | p.value | CrI |
| d. B. C | 0.68 | -- |
| direct | -- | 0.0046(-6.2, 6.3) |
| indirect | -- | -1.4 (-4.8, 1.8) |
| network | -- | -1.1 (-3.9, 1.7) |
| d. H. N | 0.80 | -- |
| direct | -- | 0.72(-4.5, 5.9) |
| indirect | -- | -0.14(-4.6, 4.4) |
| network | -- | -0.073 (-3.4, 3.2) |
| d. H. I | 0.51 | -- |
| direct | -- | 4.0(-2.5, 11) |
| indirect | -- | 1.0(-5.5, 7.5) |
| network | -- | 2.2(-2.3, 6.7) |

## *3 HB*

|  |  |  |
| --- | --- | --- |
| comparison | p.value | CrI |
| d. B. C | 0.35 | -- |
| direct | -- | -2 (-13, 8.8) |
| indirect | -- | 4.2 (-4.1, 13) |
| network | -- | 1.9 (-4.8, 8.5) |
| d. H. I | 0.07 | -- |
| direct | -- | 19(-.057, 39) |
| indirect | -- | -7.8(-29, 13) |
| network | -- | 6.8(-7.1, 21) |

Notes: B = Resistance exercise; C = Aerobic exercise; H= Oral nutritional supplementation combined with Aerobic exercise; I= Oral nutritional supplementation combined with Resistance exercise; N = Usual care.

# ***Appendix F. Assessment of Model fit***

PD: It refers to the effective number of parameters, which can show the complexity of the model.

DIC: deviance information criterion， DIC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Outcomes | Model | pD | DIC | I2 |
| BMI | **Random effects** | 50.22 | 108.79 | 3% |
| Fixed effects | 36.03 | 149.94 | 50% |
| ALB | **Random effects** | 90.14 | 188.19 | 2% |
| Fixed effects | 57.03 | 373.38 | 70% |
| HB | **Random effects** | 72.54 | 158.22 | 3% |
| Fixed effects | 50.04 | 221.35 | 52% |

# ***Appendix G. Results of the network rank test*** ***(SUCRA)***

|  |  |  |  |
| --- | --- | --- | --- |
| Treatment | BMI (%) | ALB (%) | HB (%) |
| Comprehensive nursing care  | 25.34 % | 88.00 % | 72.87% |
| Resistance exercise | 47.58 % | 49.62 % | 29.43% |
| Aerobic exercise | 39.87 % | 32.39% | 44.59% |
| ONS | 39.13 % | 46.33% | 41.68% |
| Dietary intervention | 79.25 % | 89.10% | 75.49% |
| Health education | 65.42 % | 66.74% | 84.40% |
| Aerobic combined with Resistance exercise | -- | 39.17% | 54.21% |
| ONS combined with Aerobic exercise | 59.45% | 17.08% | 24.98% |
| ONS combined with Resistance exercise | 74.49% | 46.88 % | 66.38% |
| ONS combined with Aerobic and Resistance exercise | -- | 63.57% | -- |
| Usual care | 19.47% | 11.10% | 5.98% |

Notes: ONS= Oral nutritional supplementation

# ***Appendix H. Probability plot ranking of different interventions on outcome indicators***

## *1 BMI*

Notes: A= Comprehensive nursing care; B = Resistance exercise; C = Aerobic exercise; D= Oral nutritional supplementation; E = Dietary intervention; F=Health education; H= Oral nutritional supplementation combined with Aerobic exercise; I= Oral nutritional supplementation combined with Resistance exercise; N= Usual care.

## *2 ALB*

Notes: A= Comprehensive nursing care; B = Resistance exercise; C = Aerobic exercise; D= Oral nutritional supplementation; E = Dietary intervention; F=Health education; G= Aerobic combined with Resistance exercise; H= Oral nutritional supplementation combined with Aerobic exercise; I= Oral nutritional supplementation combined with Resistance exercise; J= Oral nutritional supplementation combined with Aerobic and Resistance exercise; N= Usual care.

## *3 HB*



Notes: A= Comprehensive nursing care; B = Resistance exercise; C = Aerobic exercise; D= Oral nutritional supplementation; E = Dietary intervention; F=Health education; G= Aerobic combined with Resistance exercise; H= Oral nutritional supplementation combined with Aerobic exercise; I= Oral nutritional supplementation combined with Resistance exercise; N= Usual care.

# ***Appendix I. Comparison-adjusted funnel plot***

## *1 BMI*



Notes: A= Comprehensive nursing care; B = Resistance exercise; C = Aerobic exercise; D= Oral nutritional supplementation; E = Dietary intervention; F=Health education; H= Oral nutritional supplementation combined with Aerobic exercise; I= Oral nutritional supplementation combined with Resistance exercise; N= Usual care.

## *2 ALB*

 Notes: A= Comprehensive nursing care; B = Resistance exercise; C = Aerobic exercise; D= Oral nutritional supplementation; E = Dietary intervention; F=Health education; G= Aerobic combined with Resistance exercise; H= Oral nutritional supplementation combined with Aerobic exercise; I= Oral nutritional supplementation combined with Resistance exercise; J= Oral nutritional supplementation combined with Aerobic and Resistance exercise; N= Usual care.

*3 HB*



Notes: A= Comprehensive nursing care; B = Resistance exercise; C = Aerobic exercise; D= Oral nutritional supplementation; E = Dietary intervention; F=Health education; G= Aerobic combined with Resistance exercise; H= Oral nutritional supplementation combined with Aerobic exercise; I= Oral nutritional supplementation combined with Resistance exercise; N= Usual care.

# ***Appendix J. Sensitivity Analyses for Outcomes (Results after excluding studies with higher heterogeneity one by one, but excluding individual studies)***

## *1 BMI*

|  |  |  |  |
| --- | --- | --- | --- |
| Format Comparison | No. | MD (95% CI) | I2 statistics |
|  | RE vs. UC | 3 | -0.31 [-1.73, 1.10] | 0% |
|  | ONS vs UC | 7 | -0.32 [-1.02, 0.37] | 38% |
|  | DI vs. UC | 5 | 2.40 [1.82, 2.97] | 0% |

## *2 ALB*

|  |  |  |  |
| --- | --- | --- | --- |
| Format Comparison | No. | MD (95% CI) | I2 statistics |
|  | CNC vs UC | 2 | 6.43 [5.05, 7.80] | 36% |
|  | RE vs. UC | 5 | 1.79 [0.61, 2.97] | 12% |
|  | AE vs UC | 5 | 1.03 [-0.16, 2.22] | 15% |
|  | ONS vs UC | 6 | 1.15 [0.51, 1.80] | 3% |
|  | DI vs. UC | 8 | 4.55 [3.57, 5.54] | 27% |
|  | HE vs. UC | 3 | 4.47 [3.73, 5.21] | 24% |
|  | AE+RE vs. UC | 2 | 0.04 [-1.12, 1.20] | 0% |

## *3 HB*

|  |  |  |  |
| --- | --- | --- | --- |
| Format Comparison | No. | MD (95% CI) | I2 statistics |
|  | CNC vs UC（Excluded J, L and MY, L） | 2 | 18.46 [11.68, 25.25] | 0% |
|  | CNC vs UC（Excluded R L, Z and QM, W） | 2 | 2.10 [-1.53, 5.73] | 0% |
|  | RE vs. UC（Excluded Dai S and R. Afshar） | 3 | 5.65 [2.99, 8.32] | 0% |
|  | RE vs. UC（Excluded Yan X and Cai G） | 3 | 0.44 [-1.92, 2.80] | 0% |
|  | AE vs UC | 4 | 7.48 [5.48, 9.49] | 0% |
|  | ONS vs. UC（Excluded Bolasco et al. 2011, Wen et al. 2022, Y, W et al. 2023） | 4  | 2.65 [0.07, 5.22] | 7% |
|  | ONS vs UC （Excluded Bolasco et al 2011, Wen et al 2022, Y,W et al 2023, R,C et al 2019） | 3 | 1.65 [-1.33, 4.63] | 0% |
|  | HE vs. UC | 3 | 13.70 [12.65, 14.74] | 40% |
|  | AE+RE vs. UC | 5 | 6.59 [-0.08, 13.26] | 80% |
|  | AE+RE vs. UC（Excluded M. A. Tabibi） | 4 | 3.31 [1.28, 5.34] | 0% |

Notes: CNC = Comprehensive nursing care; RE = Resistance exercise; AE = Aerobic exercise; ONS= Oral nutritional supplementation; DI = Dietary intervention; HE=Health education; ONS+RE= Oral nutritional supplementation combined with Resistance exercise; AE+RE= Aerobic combined with Resistance exercise; UC = Usual care.

# ***Appendix K.*** ***GRADE Ratings for All Contrasts***

*1 BMI* (*GRADE* *evidence ratings of improvement in BMI for Nonpharmacologic Interventions in MHD patients)*

|  |  |  |  |
| --- | --- | --- | --- |
| Format Comparison | Direct comparison | Indirect comparison | Network  |
| MD（95%CrI) | Quality of evidence | MD（95%CrI) | Quality of evidence | MD（95%CrI) | Quality of evidence |
| CNC VS UC | -0.16 (-2.9,2.6) | low | NA | NA | -0.16 (-2.9,2.6) | low |
| RE VS UC  | 0.75 (-1.0,2.4) | very low | NA | NA | 0.75 (-1.0,2.4) | very low |
| AE VS UC  | 0.49 (-1.4, 2.4) | low | NA | NA | 0.49 (-1.4, 2.4) | low |
| ONS VS UC  | 0.50 (-0.49, 1.5) | very low | NA | NA | 0.50 (-0.49, 1.5) | very low |
| DI VS UC  | 1.8 (0.49, 3.1) | low | NA | NA | 1.8 (0.49, 3.1) | low |
| HE VS UC  | 1.5 (-1.4, 4.3) | low | NA | NA | 1.5 (-1.4, 4.3) | low |
| ONS+AE VS ONS  | 0.67 (-1.3.2.6) | low | NA | NA | 0.67 (-1.3.2.6) | low |
| ONS+RE VS ONS | 1.3 (-1.2.3.6) | low | NA | NA | 1.3 (-1.2.3.6) | low |
| ONS+AE VS UC | -1.6 (-6.4, 3.2) | low | -0.88 (-3.4, 1.7) | low | -1.2(-3.3,1.0) | low |
| ONS+AE VS ONS+RE | 1.1 (-2.0, 4.2) | low | -3.1(-9.1, 2.9) | low | 0.66(-2.1, 3.2) | low |

Notes: CNC = Comprehensive nursing care; RE = Resistance exercise; AE = Aerobic exercise; ONS = Oral nutritional supplementation; DI = Dietary intervention; HE=Health education; ONS+AE= Oral nutritional supplementation combined with Aerobic exercise; ONS+RE= Oral nutritional supplementation combined with Resistance exercise; UC = Usual care; NA = Not Applicated.

*2 ALB* (*GRADE* *evidence ratings of improvement in ALB for Nonpharmacologic Interventions in MHD patients)*

|  |  |  |  |
| --- | --- | --- | --- |
| Format Comparison | Direct comparison | Indirect comparison | Network |
| MD（95%CrI) | Quality of evidence | MD（95%CrI) | Quality of evidence | MD（95%CrI) | Quality of evidence |
| CNS VS UC | 6.0 (3.4, 8.7) | very low | NA | NA | 6.0 (3.4, 8.7) | very low |
| RE VS UC | 2.1 (0.20, 4.6) | low | NA | NA | 2.1 (0.20,4.6) | low |
| AE VS UC | 1.3 (-0.7.0, 3.3) | very low | NA | NA | 1.3 (-0.7.0, 3.3) | very low |
| ONS VS UC | 2.1 (0.51, 3.8) | very low | NA | NA | 2.1 (0.51, 3.8) | very low |
| DI VS UC | 6.0 (4.3, 7.8) | very low | NA | NA | 6.0 (4.3, 7.8) | very low |
| HE VS UC | 3.7 (1.1, 6.3) | very low | NA | NA | 3.7 (1.1, 6.3) | very low |
| AE+RE VS UC | 1.7 (-1.2, 4.7) | low | NA | NA | 1.7 (-1.2, 4.7) | low |
| ONS+AE VS ONS | -2.0 (-5.1, 1.0) | very low | NA | NA | -2.0 (-5.1, 1.0) | very low |
| ONS+RE VS ONS | 0.13 (-3.7, 4) | moderate | NA | NA | 0.13 (-3.7, 4) | moderate |
| ONS+AE+RE VS ONS | 3.3 (-12, 19) | low | NA | NA | 3.3 (-12, 19) | low |
| RE VS AE | 0.0046 (-6.2, 6.3) | low | -1.4 (-4.8, 1.8) | very low | -1.1 (-3.9, 1.7) | low |
| ONS+AE VS UC | 0.72 (-4.5, 5.9) | low | -0.14 (-4.6, 4.4) | low | -0.073 (-3.4, 3.2) | low |
| ONS+AE VS ONS+RE | 4.0 (-2.5, 11) | moderate | 1.0(-5.5, 7.5),  | very low | 2.2(-2.3, 6.7) | moderate |

Notes: CNC = Comprehensive nursing care; RE = Resistance exercise; AE = Aerobic exercise; ONS = Oral nutritional supplementation; DI = Dietary intervention; HE=Health education; ONS+AE= Oral nutritional supplementation combined with Aerobic exercise; ONS+RE= Oral nutritional supplementation combined with Resistance exercise; ONS+AE+RE= Oral nutritional supplementation combined with Aerobic and Resistance exercise; UC = Usual care; NA = Not Applicated.

*3 HB* (*GRADE evidence ratings of improvement in HB for Nonpharmacologic Interventions in MHD patients)*

|  |  |  |  |
| --- | --- | --- | --- |
| Format Comparison | Direct comparison | Indirect comparison | Network |
| MD（95%CrI) | Quality of evidence | MD（95%CrI) | Quality of evidence | MD（95%CrI) | Quality of evidence |
| CNC VS UC | 9.1 (3, 16) | very low | NA | NA | 9.1 (3, 16) | very low |
| RE VS UC | 3.4(-1.6, 8.4) | low | NA | NA | 3.4(-1.6, 8.4) | low |
| AE VS UC | 5.4 (0.27, 11) | very low | NA | NA | 5.4 (0.27, 11) | very low |
| ONS VS UC | 5 (0.71, 9.4) | very low | NA | NA | 5 (0.71, 9.4) | very low |
| DI VS UC | 9.2 (5.1, 13) | moderate | NA | NA | 9.2 (5.1, 13) | moderate |
| HE VS UC | 11 (5.4, 16) | moderate | NA | NA | 11 (5.4, 16) | moderate |
| AE+RE VS UC | 6.6 (1.2,12) | very low | NA | NA | 6.6 (1.2,12) | very low |
| ONS+AE VS ONS | -2.8 (-12, 5.5) | low | NA | NA | -2.8 (-12, 5.5) | low |
| ONS+RE VS ONS | 3.9 (-8.3, 16) | low | NA | NA | 3.9 (-8.3, 16) | low |
| RE VS AE | -2 (-13, 8.8) | low | 4.2 (-4.1, 13) | very low | 1.9(-4.8, 8.5) | low |
| ONS+AE VS ONS+RE | 19. (-0.57, 39) | low | -7.8(-29, 13) | low | 6.8(-7.1, 21) |  low |

Notes: CNC = Comprehensive nursing care; RE = Resistance exercise; AE = Aerobic exercise; ONS = Oral nutritional supplementation; DI = Dietary intervention; HE=Health education; ONS+AE= Oral nutritional supplementation combined with Aerobic exercise; ONS+RE= Oral nutritional supplementation combined with Resistance exercise; AE+RE= Aerobic combined with Resistance exercise; ONS+AE+RE= Oral nutritional supplementation combined with Aerobic and Resistance exercise; UC = Usual care; NA = Not Applicated.