JOURNAL OF THE INTERNATIONAL SOCIETY FOR PERITONEAL DIALYSIS
Peritoneal Dialysis INTERNATIONAL

Supplemental Materials for

Association of Body Mass Index with Mortality in Peritoneal Dialysis Patients: A Systematic Review and Meta-Analysis

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S1: Search strategies:

PubMed, EBSCO CINAHL, and Cochrane Central Register of Controlled Trials:

((Renal Insufficiency, Chronic) OR (chronic renal insufficien*) OR (Kidney Failure, Chronic) OR (chronic renal failure) OR (end?stage kidney disease*) OR (end?stage renal disease*) OR ESRD OR (chronic kidney disease*) OR (chronic renal disease*) OR (Renal Dialysis) OR ((renal OR kidney) AND dialys*) OR hemodialys* OR haemodialys* OR ((peritoneal OR extracorporeal) AND dialys*) OR Kidney Transplantation OR ((kidney OR renal) AND transplant*)) AND ((body mass index) OR BMI OR overweight OR obes*) AND (mortality OR (death rate*) OR (case fatality rate*) OR survival OR (reverse epidemiolog*) OR (obesity AND paradox*))

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Web of Sciences:

(TS=(((Renal Insufficiency, Chronic) OR (chronic renal insufficien*) OR (Kidney Failure, Chronic) OR (chronic renal failure) OR (end?stage kidney disease*) OR (end?stage renal disease*) OR ESRD OR (chronic kidney disease*) OR (chronic renal disease*) OR (Renal Dialysis) OR ((renal OR kidney) AND dialys*) OR hemodialys* OR haemodialys* OR ((peritoneal OR extracorporeal) AND dialys*) OR Kidney Transplantation OR ((kidney OR renal) AND transplant*)) AND ((body mass index) OR BMI OR overweight OR obes*) AND (mortality OR (death rate*) OR (case fatality rate*) OR survival OR (reverse epidemiolog*) OR (obesity AND paradox*)))) AND Document Types=(Article OR Abstract of Published Item OR Meeting Abstract OR Meeting Summary OR Proceedings Paper)

EMBASE:

((chronic kidney disorder) OR (chronic nephropathy) OR (chronic renal disease) OR (chronic kidney failure) OR (chronic kidney insufficiency) OR (chronic renal failure) OR (chronic renal insufficiency) OR (kidney chronic failure) OR (Kidney Failure, Chronic) OR (end?stage kidney disease*) OR (end?stage renal disease*) OR ESRD OR (renal replacement therapy) OR ((renal OR kidney) AND dialys*) OR hemodialys* OR haemodialys* OR ((peritoneal OR extracorporeal) AND dialys*) OR Kidney Transplantation OR ((kidney OR renal) AND transplant*)) AND ((body mass index) OR BMI OR overweight OR obes*) AND (mortality OR (death rate*) OR (case fatality rate*) OR survival OR (reverse epidemiolog*) OR (obesity AND paradox*))

S2: Newcastle–Ottawa Quality Assessment Scale for cohort studies:

Selection	Score
1. Representativeness of the exposed cohort:	
Representative of the average peritoneal dialysis patients	1
Selected group of users (not representative)	0
No description of the derivation of the cohort	0
2. Selection of the non-exposed cohort	
Drawn from the same community as the exposed cohort	1
Drawn from a different source	0
No description of the derivation of the non-exposed cohort	0
3. Ascertainment of exposure	
Secure record or structured interview	1
Written self-report	0
No description	0
4. Demonstration that outcome of interest was not present at start of study	
Yes	1
No	0
Comparability	
5.A. Comparability of cohorts on the basis of the design or analysis	
Study has controlled for age and gender plus at least 3 of the following 6 covariates: diabetes mellitus, hypertension, ischemic heart disease or coronary artery disease, cerebrovascular disease, serum albumin and cholesterol, and dialysis modality	1

5.B. Study has tested the 'proportionality' assumption for the Cox proportional hazards model(s)	1
None	0
Outcome	
6. Assessment of outcome	
Independent blind assessment or record linkage	1
Self-report	0
No description	0
7. Sufficiently long follow-up for outcomes to occur (>1 year)	
Yes	1
No	0
8. Adequacy of follow up of cohorts	
Complete follow up (all subjects accounted for) or subjects lost are unlikely to introduce bias (<20% number lost) or lost subjects are numerous, but description is provided of those lost	1
Lost subjects are numerous, and no description is provided for those lost	0

S3: Additional characteristics of included studies:

Study ID	Major ESRD Etiologies	Range of BMI values	% trans. from HD	PD characteristics	End points	# of deaths and Major causes	Covariates in Cox Proportional Hazards Models	Additional Analyses
Studies included in meta-analyses:								
Fernandes *et al* (2013)	N/A	10 to 38	68%	Modalities: CAPD (51%); APD (49%), Solutions: glucose-based	Death, transfer to HD, kidney transplantation, renal function recovery.	#: N/A; Causes CVD: 34%	Baseline comorbidities (CVD and DM), PD modality (APD or CAPD), renal replacement therapy, calendar year.	Restricted cubic splines to evaluate non-linear relationship between BMI and mortality risk.
Pliakogiannis *et al* (2007)	DM: 36%, CGN: 19%, HTN/ Nephrosclerosis: 19%.	N/A	N/A	N/A	Death, transplantation.	# and causes: N/A	Age, gender, race, initial diagnosis, primary disease.	None
McDonald *et al* (2003)	N/A	15 to 40	41% (Median time on HD: 38 days; IQR: 20 – 89 days)	Modalities: CAPD (vast majority), APD, and tidal PD.	Death, transfer to HD, transplantation.	#: 3,133 (plus 296 within 60 days after transfer to HD) Causes CVD: 56:	Age, gender, race, DM, CAD, peripheral vascular disease, cerebrovascular disease, chronic lung disease, treated HTN, current smoking, country, size of dialysis center	Cubic splines to evaluate non-linear relationship between BMI and mortality risk.
Snyder *et al* (2003)	DM: 47% HTN: 20% Glumerulonephritis: 13%	N/A	N/A	N/A	Death, transfer to HD, transplantation.	# and causes: N/A	Incident year, age, gender, race, albumin, hemoglobin, comorbidities (IHD, CHF, cardiac dysrhythmias, cerebrovascular disease, peripheral vascular disease, COPD, tobacco use, cancer, inability to ambulate or transfer)	Cox regression on intention-to-teat basis, in which switch to HD and transplantation were ignored [results are not shown]

Studies excluded from meta-analyses:								
Mehrotra *et al*. (2009) (16)	DM: 46% HTN: 22% GN: 15%	21.88 to 31.37	N/A	Modalities: CAPD (65%), APD (35%)	Death, transfer to HD or 'other' PD, kidney transplantation.	# and causes: N/A	case- mix differences in cohorts, age, gender, race, cause of end-stage renal disease, individual comorbidities, baseline body mass index, estimated glomerular filtration rate, baseline laboratory values (hemoglobin, blood urea nitrogen, and albumin), type of dialysis facility (for-profit, non-profit, other), and dialysis facility census (period-prevalent numbers of hemodialysis and PD patients).	None
Badve *et al* (2008)	N/A	N/A	N/A	Modalities: CAPD (58%), APD (42%),	Death, transfer to HD, kidney transplantation.	# and causes: N/A	None	None
Ramkumar *et al* (2005)	DM: 42%	N/A	N/A	N/A	Death, transplantation.	# due to all causes: 4,142 # due to Cardiovascular causes: 2,338	Age, gender, race, Medicare insurance, functioanl status, serumalbumin, comorbidities (DM as cause of RF, CAD, cardiac arrhthmias, CHF, cerebrovascular disease, peripheral vascular disease, HTN, lung disease, cancer, current smoker.	None
Abbott *et al* (2004)	N/A	14 to 46	N/A	N/A	Death, transfer to HD (but not transplantation)	Total # of death: 989; Transfer to HD-	Age, gender, race, DM as the cause of ESRD, CHF, IHD, peripheral vascular disease, pulse	None

						censored # of death: 585 Causes: N/A	pressure, ability to walk independently, serum albumin and cholesterol, malnutrition (subjective), renal transplantation (as time-dependent covariate), and use of aspirin, ACEI inhibitors, beta blockers, and HMG-CoA reductase inhibitors.	
Stack *et al* (2004)	N/A for PD patients separately (DM: 44% for all patients)	8.8 to 75.2	N/A	N/A	Death, transplantation (transfer to HD was accounted for, but patients were still followed up after transfer to HD)	#: 3,896 Causes: N/A	Age, gender, race, HTN, CHF, CAD, peripheral vascular and cerebrovascular disease, tobacco use, COPD, history of cardiac arres/arrhythmia, ADIS, neoplasm, serum albumin, hematocrit, estimated GFR, pre-ESRD erythropoietin use, and ability to walk or transfer without assistance.	None

S4: Quality assessment of included studies.

	Selection				Comparability		Outcome Assessment			
Study ID	Represent-ativeness	Selection of non-exposed	Ascertain ment of exposure	Absence of outcome at baseline	Sufficient adjustment	"Proporti-onality" is tested	Blinded outcome assessment	Sufficient follow-up duration	Sufficient follow-up rate	Total NOS Score
Studies included in meta-analyses:										
Fernandes *et al* (2013) (8)	1	1	1	1	0	0	1	1	1	7
Pliakogiannis *et al* (2007) (9)	1	1	1	1	0	0	1	1	1	7
McDonald *et al* (2003) (10)	1	1	1	1	1	0	1	1	1	8
Snyder *et al* (2003) (11)	1	1	1	1	1	0	1	1	1	8
Studies excluded from meta-analyses:										
Mehrotra *et al* (2009) (16)	1	1	1	1	1	1	1	1	1	9
Badve *et al* (2008) (12)	1	1	1	1	0	1	1	1	1	8
Ramkumar *et al* (2005) (13)	1	1	1	1	1	0	1	1	1	8
Abbott *et al* (2004) [13]	1	1	1	1	1	1	1	1	1	9
Stack *et al* (2004) (15)	1	1	1	1	1	0	1	1	1	8

S5: Abstracted numerical findings regarding the association of BMI with mortality:

Studies included in meta-analyses:			
Fernandes *et al* (2013)	Cox regression (association with baseline BMI categories): BMI <18.5: HR=1.72; CI: 1.15–2.55 BMI 18.5 – 24.9: REFERENCE BMI 25.0 – 29.9: HR=0.74; CI: 0.56–0.98 BMI ≥30: HR=0.63; CI: 0.42–0.95	Cox regression (association with normalized weight change categories during 1st year of PD treatment): <-3.1%: HR=1.94; CI: 1.35–2.8 -3.1% - 0.12%: HR=1.29; CI: 0.86–1.95 0.12% - 3.1%: REFERENCE 3.1% - 7.1%: HR=1.10; CI: 0.74–1.63 ≥7.1%: HR= 0.81; CI: 0.54–1.24	
Pliakogiannis *et al* (2007)	Cox regression (association with baseline BMI categories): BMI <18.5: HR=1.3; CI: 1.1 – 1.6 BMI 18.5 – 24.9: REFERENCE BMI 25.0 – 29.9: HR=0.94; CI: 0.86 – 1.04 BMI ≥30.0: HR=1.009; CI: 0.89 – 1.14		
McDonald *et al* (2003)	Cox regression (association with baseline BMI categories): BMI ≤19.9: HR=1.02; CI: 0.90 – 1.17 BMI 20.0 – 24.9: REFERENCE BMI 25.0 – 29.9: HR=1.01; CI: 0.92 – 1.11 BMI ≥30: HR=1.36; CI: 1.20 – 1.54	Cox regression (association with baseline BMI categories **in participants with Maori/Pacific Islander Racial Origin**): BMI ≤19.9: HR=1.27; CI: 0.76 – 2.14 BMI 20.0 – 24.9: REFERENCE BMI 25.0 – 29.9: HR=0.85; CI: 0.65 – 1.12 BMI ≥30.0: HR=0.88; CI: 0.68 – 1.13	
Snyder *et al* (2003)	Cox regression (association of **1-year** mortality with baseline BMI categories): BMI <18.5: HR=1.46; CI: 1.30 -1.62 BMI 18.5 - 24.9: REFERENCE BMI 25.0 - 29.9: HR=0.84; CI: 0.79 - 0.88 BMI ≥30.0: HR=0.89; CI: 0.83 - 0.95	Cox regression (association with **2-year** mortality from baseline BMI categories): BMI <18.5: HR=1.27; CI: 1.09 - 1.47 BMI 18.5 - 24.9: REFERENCE BMI 25.0 - 29.9: HR=0.91; CI: 0.83 - 0.98 BMI ≥30: HR=1.07; CI: 0.99 - 1.15	Cox regression (association with 3-**year** mortality from baseline BMI categories): BMI <18.5: HR=1.05; CI: 0.82 - 1.34 BMI 18.5 - 24.9: REFERENCE BMI 25.0 - 29.9: HR=1.04; CI: 0.93 - 1.15 BMI ≥30.0: HR=1.16; CI: 1.01 - 1.32

Studies excluded from meta-analyses:			
Mehrotra *et al* (2009)	Piecewise exponential survival models (association with all-cause mortality of baseline BMI categories): BMI <21.88: REFERENCE BMI 21.88 - 24.61: HR=0.90; CI: 0.86 - 0.94 BMI 24.61 - 27.43:HR =0.82; CI: 0.79 - 0.86 BMI 27.43 - 31.37: HR=0.86; CI: 0.82 - 0.90 BMI >31.37: HR=0.94; CI: 0.89 - 0.98 Data missing: HR=0.93; CI: 0.89 - 0.98	Piecewise exponential survival models (association with technique failure of baseline BMI categories): BMI <21.88: REFERENCE BMI 21.88 - 24.61: HR=1.03; CI: 0.98 - 1.08 BMI 24.61 - 27.43:HR =1.06; CI: 1.01 - 1.11 BMI 27.43 - 31.37: HR=1.15; CI: 1.10 - 1.21 BMI >31.37: HR=1.37; CI: 1.30 - 1.44 Data missing: HR=1.02; CI: 0.96 - 1.08	
Badve *et al* (2008)	Cox regression (association with mortality of baseline BMI categoreis): BMI <19.9: HR=0.79; CI: 0.58 - 1.06 BMI 20.0 - 24.9: REFERENCE BMI 25.0 - 29.9: HR=1.02; CI: 0.89 - 1.18 BMI >30.0: HR=1.31; CI: 0.93 - 1.48		
Ramkumar *et al* (2005)	Cox regression (association with mortality of baseline BMI/Urine Cr categories): Urine Cr >0.64/ BMI 18.5 - 24.9: REFERENCE Urine Cr >0.64/ BMI>25.0: HR=0.90; CI: 0.83 - 0.97 Urine Cr <0.64/ BMI 18.5 - 24.9: HR=1.20; CI: 1.09 - 1.31 Urine Cr ≤0.64/ BMI≥25.0: HR=1.29; CI: 1.17 - 1.42	Cox regression (association with mortality of BMI/Urine Cr categories): Urine Cr >0.64/ BMI 18.5 - 24.9: REFERENCE Urine Cr >0.64/ BMI>25: HR=0.88; CI: 0.79 - 0.97 Urine Cr <0.64/ BMI 18.5 - 24.9: HR=1.22; CI: 1.08 - 1.38 Urine Cr ≤0.64/ BMI≥25.0: HR=1.21; CI: 1.06 - 1.39	

Abbott *et al* (2004)	Cox regression (association with mortality of baseline quartiles of BMI; censored on change to HD): BMI <22.4: HR=1.12; CI: 0.88 - 1.42 BMI 22.4 - 25.7: HR=0.88; CI: 0.69 - 1.11 BMI 25.7 - 29.5: HR=0.93; CI: 0.74 - 1.16 BMI >29.5: REFERENCE	Cox regression (association with mortality of baseline dichotomized BMI; censored on change to HD): BMI <30: REFERENCE BMI ≥30: HR=1.03; CI: 0.86 - 1.22	
Stack *et al* (2004)	Cox regression (association with mortality of baseline quintiles of BMI **in diabetics**): BMI 8.8 - 20.9: HR=1.20; CI: 1.01 - 1.43 (*P* <0.05) BMI 20.9 - 23.5: HR=1.02; CI: N/A (non-significant) BMI 23.5 - 26.1: REFERENCE BMI 26.1 - 30.0: HR=0.98; CI: N/A (non-significant) BMI >30.0: HR=1.01; CI: N/A (non-significant)	Cox regression (association with mortality of baseline quintiles of BMI **in non-diabetics**): BMI 8.8 - 20.9: HR=1.39; CI: N/A (*P* <0.001) BMI 20.9 - 23.5: HR=1.04; CI: N/A (non-significant) BMI 23.5 - 26.1: REFERENCE BMI 26.1 - 30.0: HR=0.98; CI: N/A (non-significant) BMI >30.0: HR=1.01; CI: N/A (non-significant)	

S6: Abstracted numerical findings regarding the association of BMI with technique failure (transfer to hemodialysis):

Mehrotra *et al* (2009)	Piecewise exponential survival models (association with death-censored transfer to HD with baseline BMI categories): BMI <21.88: REFERENCE BMI 21.88 - 24.61: HR=1.03; CI: 0.98 - 1.08 BMI 24.61 - 27.43:HR =1.06; CI: 1.01 - 1.11 BMI 27.43 - 31.37: HR=1.15; CI: 1.10 - 1.21 BMI >31.37: HR=1.37; CI: 1.30 - 1.44 Data missing: HR=1.02; CI: 0.96 - 1.08		
Badve *et al* (2008)	Cox regression (association with death-censored transfer to HD with baseline BMI categories): BMI <19.9: HR=0.89; CI: 0.73 - 1.09 BMI 20.0 - 24.9: REFERENCE BMI 25.0 - 29.9: HR=1.10; CI: 0.98 - 1.22 BMI >30.0: HR=1.30; CI: 1.11 - 1.52		
McDonald *et al* (2003)	Cox regression (association with transfer to HD with baseline BMI categories): BMI <19.9: HR=0.89; CI: 0.80 - 1.99 BMI 20.0 - 24.9: REFERENCE BMI 25.0 - 29.9: HR=1.15; CI: 1.06 - 1.24 BMI >30.: HR=1.16; CI: 1.07 - 1.26		
Snyder *et al* (2003)	Cox regression (association with *1-year* transfer to HD with baseline BMI categories): BMI <18.5: HR=0.92; CI: 0.79 - 1.06 BMI 18.5 - 24.9: REFERENCE BMI 25.0 - 29.9: HR=1.07; CI: 1.01 - 1.13 BMI >30.0: HR=1.28; CI: 1.20 - 1.36	Cox regression (association with *2-year* transfer to HD with baseline BMI categories): BMI <18.5: HR=0.97; CI: 0.81 - 1.15 BMI 18.5 - 24.9: REFERENCE BMI 25.0 - 29.9: HR=1.11; CI: 1.03 - 1.19 BMI >30.0: HR=1.29; CI: 1.19 - 1.39	Cox regression (association with *3-year* transfer to HD with baseline BMI categories): BMI <18.5: HR=0.80; CI: 0.62 - 1.02 BMI 18.5 - 24.9: REFERENCE BMI 25.0 - 29.9: HR=1.03; CI: 0.92 - 1.15 BMI >30.0: HR=1.36; CI: 1.20 - 1.53