FRUIT AND VEGETABLE INTAKE AND MORTALITY IN ADULTS UNDERGOING MAINTENANCE HEMODIALYSIS

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SUPPLEMENTARY MATERIAL LEGEND

Supplemental Table 1. Combined intake of fruits and vegetables by country

Supplemental TableS2. Adjusted association (hazard ratio, 95% confidence interval) between baseline clinical characteristics and fruits and vegetables intake with mortality (clustered by country)

Supplemental Table 3. Adjusted mortality hazard ratio (95% confidence interval) by fruit and vegetable intake (tertiles of serving per week) and protein intake from fruit and vegetables (1 gram per day increase)

Supplemental Table 4. All-cause mortality hazard ratios (95% confidence interval) for fruits and vegetables intake

Supplemental Table 5. Cardiovascular mortality hazard ratios (95% confidence interval) for fruits and vegetables intake

Supplemental Table 6. Non-cardiovascular mortality hazard ratios (95% confidence interval) for fruits and vegetables intake

Supplemental Table 1. Combined intake of fruits and vegetables by country

Country	Servings per week Median (interquartile range)
Turkey	4.0 (1.5-8.0)
Poland	6.0 (3.5-10.0)
Romania	7.5 (4.0-11.0)
Spain	7.5 (3.0-11.0)
Argentina	8.0 (4.0-14.0)
Hungary	8.0 (4.0-12.5)
France	8.5 (5.5-14.0)
Germany	8.5 (6.0-14.0)
Portugal	10.0 (6.0-17.0)
Sweden	10.0 (7.5-14.0)
Italy	12.5 (7.0-17.0)

Supplemental Table 2. Adjusted association (hazard ratio, 95% confidence interval) between baseline clinical characteristics and fruits and vegetables intake with mortality (clustered by country)

	Cardiovascular mortality	P value	Non-cardiovascular mortality	P value	All-cause mortality	P value
Fruits and vegetables intake (tertiles)		0.14		0.01		0.002
0 to 5.5	1.00		1.00		1.00	
5.6 to 10	0.95 (0.81-1.11)		0.88 (0.76-1.02)		0.90 (0.81-1.00)	
>10	0.84 (0.70-1.00)		0.77 (0.66-0.91)		0.80 (0.71-0.91)	
Age (1 year increase)	1.02 (1.01-1.03)	<.001	1.02 (1.01-1.03)	<.001	1.02 (1.02-1.03)	<.001
Male	1.20 (1.04-1.39	0.01	1.22 (1.07-1.39)	<.001	1.21 (1.09-1.34)	0.001
Current or former smoker[*]	1.27 (1.08-1.49)	<.001	1.06 (0.92-1.24)	0.27	1.16 (1.04-1.30)	0.03
Daily physical activity[*]	0.85 (0.68-1.06)	0.23	0.91 (0.73-1.14)	0.69	0.86 (0.73-1.01)	0.11
Energy intake (1000 kcal/day increase)[*]	1.00 (0.93-1.07)	0.89	1.00 (0.97-1.10)	0.30	1.01 (0.96-1.06)	0.66
Life partner	-		-		0.87 (0.78-0.98)	0.02
Secondary education	0.82 (0.70-0.95)	0.01	-		0.88 (0.79-0.97)	0.03
Diabetes	1.26 (1.07-1.50)	0.01	-			
Myocardial infarction	1.57 (1.30-1.90)	<.001	0.94 (0.79-1.13)	0.01	1.20 (1.06-1.37)	<.001
Arteriovenous fistula	0.78 (0.67-0.92)	<.001	0.59 (0.52-0.68)	<.001	0.68 (0.62-0.76)	<.001
Body-mass index (kg/m^2)		<.001		<.001		<.001
Underweight (<18.5)	1.00		1.00		1.00	
Normal range (18.5-24.9)	0.75 (0.55-1.01)		0.63 (0.50-0.81)		0.66 (0.55-0.80)	
Pre-obese (25.0-29.9)	0.54 (0.40-0.74)		0.47 (0.36-0.60)		0.48 (0.40-0.59)	
Obese (≥30.0)	0.49 (0.35-0.68)		0.43 (0.32-0.56)		0.43 (0.34-0.53)	
Albumin tertiles (g/L)		<.001		<.001		<.001
Lowest (<38)	1.00		1.00		1.00	
Middle (38-41)	0.66 (0.54-0.79)		0.60 (0.51-0.70)		0.62 (0.55-0.70)	

	Cardiovascular mortality	P value	Non-cardiovascular mortality	P value	All-cause mortality	P value
Highest>41)	0.56 (0.45-0.70)		0.45 (0.37-0.54)		0.49 (0.42-0.56)	
Charlson comorbidity score quartiles		<.001		<.001		<.001
0-4	1.00		1.00		1.00	
43256	1.59 (1.11-2.26)		1.97 (1.35-2.87)		1.75 (1.35-2.27)	
43319	2.20 (1.48-3.26)		2.67 (1.78-4.00)		2.40 (1.81-3.17)	
>8	3.26 (2.11-5.05)		4.57 (2.97-7.03)		3.90 (2.89-5.28)	
Hemoglobin (g/dL)	0.92 (0.87-0.97)	0.001	0.91 (0.87-0.96)	<.001	0.91 (0.88-0.94)	<.001
Phosphorus (mg/dL)	1.08 (1.03-1.14)	0.002	-		1.05 (1.01-1.09)	0.01
Calcium, (mg/dL)	1.21 (1.10-1.33)	0.001	-		1.15 (1.07-1.22)	<.001
Primary renal diagnosis			-	<.001		<.001
Diabetes	-		1.00		1.00	
Hypertension	-		0.95 (0.79-1.14)		0.90 (0.79-1.03)	
Glomerulonephritis	-		0.85 (0.66-1.09)		0.81 (0.68-0.98)	
Other	-		0.97 (0.82-1.13)		0.84 (0.75-0.95)	
Wait-listed for transplant	-		0.57 (0.43-0.75)	<.001	0.76 (0.63-0.91)	0.01
Time on dialysis (year)	-		-		1.01 (1.00-1.02)	0.04
Kt/V	-		-		0.83 (0.72-0.97)	0.02

[*]These were clinically relevant variables specified *a priori*. The remaining variables included in each model were selected by backward elimination because they significantly predicted mortality (p < 0.05) or had a clinically meaningful impact on the hazard ratio for mortality (≥ 10%). Other variables tested as potential confounders were: race, occupation, hypertension, stroke, grams per day of nutrients (monounsaturated fatty acids, saturated fatty acids, *trans* fatty acids, n-3 long chain polyunsaturated fatty acids, n-6 polyunsaturated fatty acids, cereal fiber, protein, alcohol, and sugar), servings per week of foods (legumes, cereals, dairy, white meat, red and processed meat, fish, olive oil, sweets and sweet drinks), and Mediterranean diet score.

Supplemental Table 3. Adjusted mortality hazard ratio (95% confidence interval) by fruits and vegetables intake (tertiles of serving per week) and plant-based protein intake (one gram/day increase)

	[a]Cardiovascular mortality	P value	[b]Non-cardiovascular mortality	P value	[c]All-cause mortality	P value
Fruits and vegetables intake						
0 to 5.5	1.00	0.13	1.00	**0.04**	1.00	**0.01**
5.6 to 10	0.94 (0.81-1.11)		0.89 (0.77-1.04)		0.91 (0.81-1.01)	
>10	0.83 (0.69-100)		**0.81 (0.68-0.95)**		**0.81 (0.72-0.92)**	
Plant based protein intake	1.00 (0.99-1.02)	0.65	**0.98 (0.97-1.00)**	**0.02**	0.99 (0.98-1.00)	0.21
Fruits intake						
0 to 1	1.00	0.97	1.00	0.08	1.00	0.30
1.1 to 6	1.01 (0.84-1.21)		0.87 (0.73-1.03)		0.92 (0.81-1.05)	
>6	0.99 (0.83-1.19)		**0.84 (0.71-0.98)**		0.91 (0.81-1.03)	
Plant based protein intake	1.00 (0.99-1.02)	0.91	**0.98 (0.97-1.00)**	**0.01**	0.99 (0.98-1.00)	0.11
Vegetables intake						
0 to 1	1.00	0.57	1.00	0.70	1.00	0.36
1.1 to 3	1.02 (0.86-1.21)		1.01 (0.86-1.17)		0.99 (0.88-1.11)	
>3	0.93 (0.78-1.12)		0.95 (0.80-1.11)		0.92 (0.82-1.04)	
Plant based protein intake	1.00 (0.99-1.02)	0.91	**0.98 (0.97-1.00)**	**0.01**	0.99 (0.98-1.00)	0.11

[a]Adjusted for country (fixed effect in competing risk analysis and random effect in the others), gender, smoking (current or former versus never), daily physical activity, life partner, education (secondary versus none/primary), primary renal diagnosis, myocardial infarction, vascular access type (fistula versus graft/catheter), body mass index (categories according to WHO), albumin (tertiles), Charlson comorbidity score (quartiles), wait-listed for transplantation, age, phosphorus, calcium, hemoglobin, Kt/V, time on dialysis, and total energy intake (1000 kcal day increase). Analyses for fruits are adjusted for vegetables and vice versa.

Supplemental Table 4. All-cause mortality hazard ratios (95% confidence interval) for fruits and vegetables intake

Servings per week	Univariable random effect	P value	[*]Multivariable competing risk, fixed effect	P value	[*]Multivariable case-complete, random effect	P value
Fruits and vegetables						
1 serving increase	**0.99 (0.99-1.00)**	**0.01**	**0.99 (0.98-0.99)**	**0.001**	**0.98 (0.97-0.99)**	**<0.001**
Tertiles						
0 to 5.5	1.00	**0.03**	1.00	**0.003**	1.00	**<.0.001**
5.6 to 10	0.93 (0.84-1.03)		0.91 (0.82-1.02)		**0.79 (0.67-0.94)**	
>10	**0.86 (0.77-0.96)**		**0.81 (0.71-0.91)**		**0.65 (0.54-0.78)**	
Fruits						
1 serving increase	0.99 (0.98-1.00)	0.09	**0.99 (0.98-1.00)**	**0.02**	**0.97 (0.96-0.99)**	**<0.001**
Tertiles						
0 to 1	1.00	0.22	1.00	0.30	1.00	**0.04**
1.1 to 6	0.91 (0.81-1.02)		0.93 (0.82-1.05)		0.86 (0.70-1.05)	
>6	0.93 (0.83-1.03)		0.91 (0.81-1.03)		**0.80 (0.67-0.95)**	
Vegetables						
1 serving increase	**0.99 (0.97-1.00)**	**0.02**	0.99 (0.98-1.00)	0.11	0.98 (0.96-1.00)	0.10
Tertiles						
0 to 1	1.00	0.16	1.00	0.23	1.00	0.17
1.1 to 3	1.02 (0.91-1.13)		0.98 (0.88-1.10)		0.94 (0.79-1.12)	
>3	0.92 (0.83-1.03)		0.91 (0.80-1.02)		0.84 (0.70-1.01)	

[*]Adjusted for country (fixed effect in competing risk analysis and random effect in the others), gender, smoking (current or former versus never), daily physical activity, life partner, education (secondary versus none/primary), primary renal diagnosis, myocardial infarction, vascular access type (fistula versus graft/catheter), body mass index (categories according to WHO), albumin (tertiles), Charlson comorbidity score (quartiles), wait-listed for transplantation, age, phosphorus, calcium, hemoglobin, Kt/V, time on dialysis, and total energy intake (1000 kcal day increase). Analyses for fruits are adjusted for vegetables and vice versa.

Supplemental Table 5. Cardiovascular mortality hazard ratios (95% confidence interval) for fruits and vegetables intake

Servings per week	Univariate random effect	P value	*Multivariable competing risk, fixed effect	P value	*Multivariable case-complete, random effect	P value
Fruits and vegetables						
1 serving increase	0.99 (0.98-1.00)	0.06	0.99 (0.98-1.00)	0.13	**0.98 (0.97-1.00)**	**0.02**
Tertiles						
0 to 5.5	1.00	0.15	1.00	0.31	1.00	0.06
5.6 to 10	0.92 (0.79-1.07)		0.96 (0.81-1.12)		0.85 (0.66-1.10)	
>10	0.85 (0.72-1.00)		0.87 (0.73-1.04)		**0.72 (0.54-0.94)**	
Fruits						
1 serving increase	0.99 (0.98-1.01)	0.18	0.99 (0.97-1.01)	0.22	**0.98 (0.95-1.00)**	**0.04**
Tertiles						
0 to 1	1.00	0.77	1.00	0.98	1.00	0.65
1.1 to 6	0.95 (0.80-1.12)		1.02 (0.85-1.22)		0.93 (0.69-1.26)	
>6	0.95 (0.81-1.11)		1.01 (0.85-1.21)		0.88 (0.66-1.16)	
Vegetables						
1 serving increase	0.99 (0.97-1.01)	0.18	1.00 (0.98-1.02)	0.78	0.99 (0.96-1.02)	0.53
Tertiles						
0 to 1	1.00	0.45	1.00	0.71	1.00	0.39
1.1 to 3	1.04 (0.88-1.21)		1.02 (0.86-1.21)		1.04 (0.80-1.36)	
>3	0.94 (0.80-1.10)		0.95 (0.80-1.13)		0.87 (0.65-1.15)	

*Adjusted for country (fixed effect in competing risk analysis and random effect in the others) gender, smoking (current or former versus never), daily physical activity, education (secondary versus none/primary), diabetes, myocardial infarction, vascular access type (fistula versus graft/catheter), body mass index (categories according to WHO), albumin (tertiles), Charlson comorbidity score (quartiles), age, phosphorus, calcium, hemoglobin, and total energy intake (1000 kcal day increase). Analyses for fruits are adjusted for vegetables and vice versa.

Supplemental Table 6. Non-cardiovascular mortality hazard ratios (95% confidence interval) for fruits and vegetables intake

Servings per week	Univariable random effect	P value	*Multivariable competing risk, fixed effect	P value	*Multivariable case-complete, random effect	P value
Fruits and vegetables						
1 serving increase	0.99 (0.98-1.00)	0.05	**0.99 (0.98-1.00)**	**0.01**	**0.98 (0.97-0.99)**	**0.001**
Tertiles						
0 to 5.5	1.00	0.20	1.00	**0.03**	1.00	**0.001**
5.6 to 10	0.93 (0.81-1.07)		0.92 (0.79-1.07)		**0.81 (0.67-0.99)**	
>10	0.87 (0.75-1.01)		**0.80 (0.68-0.95)**		**0.67 (0.54-0.82)**	
Fruits						
1 serving increase	0.99 (0.98-1.01)	0.30	0.99 (0.97-1.00)	0.08	**0.98 (0.96-1.00)**	**0.01**
Tertiles						
0 to 1	1.00	0.22	1.00	0.12	1.00	0.07
1.1 to 6	0.87 (0.74-1.03)		0.90 (0.76-1.07)		0.87 (0.69-1.09)	
>6	0.91 (0.79-1.05)		**0.84 (0.72-0.99)**		**0.79 (0.64-0.97)**	
Vegetables						
1 serving increase	0.98 (0.97-1.00)	0.05	0.99 (0.97-1.00)	0.11	0.98 (0.96-1.01)	0.19
Tertiles						
0 to 1	1.00	0.33	1.00	0.54	1.00	0.30
1.1 to 3	1.00 (0.87-1.16)		0.97 (0.83-1.13)		0.97 (0.80-1.19)	
>3	0.91 (0.79-1.05)		0.91 (0.77-1.08)		0.86 (0.69-1.06)	

*Adjusted for country (fixed effect in competing risk analysis and random effect in the others), gender, smoking (current or former versus never), daily physical activity, primary renal diagnosis, myocardial infarction, vascular access type (fistula versus graft/catheter), body mass index (categories according to WHO), albumin (tertiles), Charlston comorbidity score (quartiles), wait-listed for transplantation, age, hemoglobin, and total energy intake (1000 kcal day increase). Analyses for fruits are adjusted for vegetables and vice versa.