doi: 10.14306/renhyd.31.1.2935

Plasma copeptin and 24-hour urine hydration indices in hospital pharmacy professionals: a pilot study

Copeptina Plasmática e Índices Urinarios de Hidratación de 24 Horas en Profesionales de Farmacia Hospitalaria: Estudio Piloto

Jacinta Brasil [1,2*], Fábio Cardoso [3], Pedro Soares [1], Rui Poínhos [2,4], Sandra Martins [5,6], Rui Farinha [5,6], Pedro Norton [6,7,8], Bruno MPM Oliveira [2,9,10], Flora Correia [2,3,11]

[1] Serviços Farmacêuticos, Unidade Local de Saúde São João, Porto, Portugal
[2] Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto (FCNAUP), Porto, Portugal
[3] Serviço de Nutrição, Unidade Local de Saúde São João, Porto, Portugal
[4] Departamento de Biologia e Ambiente, Escola de Ciências da Vida e do Ambiente, Universidade de Trás-os-Montes e Alto Douro (ECVA, UTAD), Vila Real, Portugal
[5] Serviço de Patologia Clínica, Unidade Local de Saúde São João, Porto, Portugal
[6] EPIUnit, Instituto de Saúde Pública da Universidade do Porto, Porto, Portugal
[7] Serviço de Saúde Ocupacional, Unidade Local de Saúde São João, Porto, Portugal
[8] Departamento de Ciências de Saúde Pública e Forenses e Educação Médica, Faculdade de Medicina da Universidade do Porto, Porto, Portugal
[9] Nephrology & Infectious Diseases R&D Group, INEB / i3S, Porto, Portugal
[10] LIAAD-INESC TEC, Porto, Portugal
[11] CBIOS - Centro de Investigação em Biociências e Tecnologias da Saúde, Universidade Lusófona, Lisboa, Portugal

* jacinta.brasil@ulssjoao.min-saude.pt

Received: 18/07/2026; Accepted: 11/11/2026; Published: 21/11/2026

Assigned editor: Rafael Almendra-Pegueros, Departamento de Ciencias Básicas de la Salud, Facultad de Ciencias de la Salud, Universidad Rey Juan Carlos (URJC), Alcorcón, Madrid, España.

CITE

Brasil J, Cardoso F, Soares P, Poínhos R, Martins S, Farinha R, Norton P, Oliveira BM, Correia F. Plasma Copeptin and 24-Hour Urine Hydration Indices in Hospital Pharmacy Professionals: A Pilot Study. Rev Esp Nutr Hum Diet. 2027; 31(1), e2935. doi: 10.14306/renhvd.31.1.2935

Obra bajo Licencia Creative Commons Reconocimiento-NoComercial-CompartirIgual 4.0 Internacional.
Más información: http://creativecommons.org/licenses/by-nc-sa/4.0/

doi: 10.14306/renhyd.31.1.2935

Table S1. Plasma osmolality and copeptin, urinary osmolality and volume, and free water reserve (FWR) according to hydration status classified by plasma copeptin (Pcop) values

	Optimal hydration (n = 2) Mean (SD)	Suboptimal hydration (n = 4) Mean (SD)	Underhydration (n = 3) Mean (SD)	Hypohydration (n = 13) Mean (SD)	p	rs
Posm (mOsm/kg)	293.5 (0.7)	291.3 (4.8)	292.0 (3.6)	291.2 (4.2)	0.607	-0.116
Pcop (pmol/L)	3.9 (0.1)	3.7 (1.3)	9.0 (1.5)	10.7 (1.8)	< 0.001	0.780
U24h osmolality (mOsm/kg)	473.5 (190.2)	363.0 (82.9)	798.3 (115.0)	491.6 (228.1)	0.931	-0.020
U24h volume (L)	2.46 (1.04)	1.68 (0.51)	1.30 (0.18)	1.92 (0.85)	0.847	0.044
FWR (mL/24h)	1063 (1053)	912 (337)	-49 (244)	851 (707)	0.897	0.029

[a] Values are expressed as mean (standard deviation).

[b] Hydration categories were defined based on sex-specific plasma copeptin (Pcop) thresholds. For men: Optimal ≤4, Suboptimal]4;8[, Underhydration [8;12[, and Hypohydration ≥12 pmol/L. For women: Optimal ≤ 2, Suboptimal]2;6[, Underhydration [6;8[, and Hypohydration ≥8 pmol/L.

rs, Spearman correlation coefficient between each continuous variable and the copeptin-based hydration category (ordinal: 1=optimal to 4=hypohydration). *p*-value refers to the Spearman correlation.

Abbreviations: Posm, plasma osmolality; Pcop, plasma copeptin; U24h osm, 24-hour urine osmolality; FWR, free water reserve.

Obra bajo Licencia Creative Commons Reconocimiento-NoComercial-CompartirIgual 4.0 Internacional.
Más información: http://creativecommons.org/licenses/by-nc-sa/4.0/

doi: 10.14306/renhyd.31.1.2935

Table S2. Plasma osmolality and copeptin, urinary osmolality and volume, and free water reserve (FWR) according to hydration status classified by urinary parameters

	Total sample (n = 22) Mean (SD)	Euhydration (n = 13) Mean (SD)	Hypohydration (n = 9) Mean (SD)	p	d
Posm (mOsm/kg)	291.5 (3.9)	291.8 (4.3)	291.1 (3.4)	0.673**	0.190
Pcop (pmol/L)	8.6 (3.4)	8.1 (3.8)	9.3 (3.0)	0.425**	0.353
U24h osmolality (mOsm/kg)	508.4 (223.6)	354.2 (87.0)	731.1 (159.8)	—	—
U24h volume (L)	1.84 (0.77)	2.11 (0.72)	1.45 (0.69)	—	—
FWR (mL/24h)	759 (687)	1179 (506)	151 (390)	—	—

[a] Values are expressed as mean (standard deviation).
[b] Participants were classified as being at risk of hypohydration when 24-h urine osmolality was > 500 mOsm/kg (Perrier et al., 2015).
[c] Hydration status was also supported by Free Water Reserve (FWR) calculation (Manz et al., 2002); negative FWR values indicate hypohydration or risk thereof.
**p-value according to Student's t-test; d represents Cohen's effect size.
—, not tested; these variables were used to define the groups.
Abbreviations: Posm, plasma osmolality; Pcop, plasma copeptin; U24h osm, 24-hour urine osmolality; FWR, free water reserve.

Obra bajo Licencia Creative Commons Reconocimiento-NoComercial-CompartirIgual 4.0 Internacional.
Más información: http://creativecommons.org/licenses/by-nc-sa/4.0/

doi: 10.14306/renhyd.31.1.2935

Table S3. Correlations between urinary osmolality and volume, free water reserve (FWR), and plasma osmolality and copeptin

	U24h osmolality (mOsm/kg)	U24h volume (L)	FWR (mL/24h)
Posm (mOsm/kg)	rs = –0.022; p = 0.922	r = 0.265; p = 0.232	r = 0.177; p = 0.431
Pcop (pmol/L)	rs = 0.110; p = 0.626	r = –0.065; p = 0.774	r = –0.114; p = 0.613

rs, Spearman's correlation coefficient; r, Pearson's correlation coefficient.
Abbreviations: Posm, plasma osmolality; Pcop, plasma copeptin; U24h osm, 24-hour urine osmolality; FWR, free water reserve.

Table S4. Relationship between the number of individuals classified by hydration status according to plasma copeptin and urinary parameters

	Classification by urinary parameters		
Classification by Pcop	Hypohydration (n = 9)	Euhydration (n = 13)	*p**
Optimal	1 (11.1%)	1 (7.7%)	0,046
Suboptimal	0 (0.0%)	4 (30.8%)	
Underhydration	3 (33.3%)	0 (0.0%)	
Hypohydration	5 (55.6%)	8 (61.5%)	

*P-value according to Fisher's exact test. Agreement between classifications (copeptin underhydration or hypohydration vs. urinary hypohydration): 59.1%; Cohen's κ = 0.24 (95% CI –0.14 to 0.62).
Abbreviations: Pcop, plasma copeptin.

Obra bajo Licencia Creative Commons Reconocimiento-NoComercial-CompartirIgual 4.0 Internacional.
Más información: http://creativecommons.org/licenses/by-nc-sa/4.0/

doi: 10.14306/renhyd.31.1.2935

Table S5. Individual values and paired changes in plasma osmolality (Posm) and copeptin (Pcop) before and after the 7-day hydration intervention (n = 5)

Participant	Posm 1st (mOsm/kg)	Posm 2nd (mOsm/kg)	Δ Posm (mOsm/kg)	Pcop 1st (pmol/L)	Pcop 2nd (pmol/L)	Δ Pcop (pmol/L)
P1	294	287	-7	9.11	11.51	+2.40
P2	286	291	+5	9.23	9.63	+0.40
P3	295	289	-6	8.97	12.43	+3.46
P4	288	288	0	10.59	10.50	-0.09
P5	294	297	+3	3.90	4.45	+0.55
Mean ± SD	291.4 ± 4.1	290.4 ± 4.0	-1.00 ± 5.34	8.36 ± 2.58	9.70 ± 3.12	+1.34 ± 1.51
95% CI of Δ	—	—	[-7.63, 5.63]	—	—	[-0.54, 3.22]
p-value*	—	—	0.697	—	—	0.118

* p-value according to paired Student's t-test.

Abbreviations: Posm, plasma osmolality; Pcop, plasma copeptin; Δ, individual paired difference (2nd assessment − 1st assessment).

Obra bajo Licencia Creative Commons Reconocimiento-NoComercial-CompartirIgual 4.0 Internacional.
Más información: http://creativecommons.org/licenses/by-nc-sa/4.0/