

Supplementary

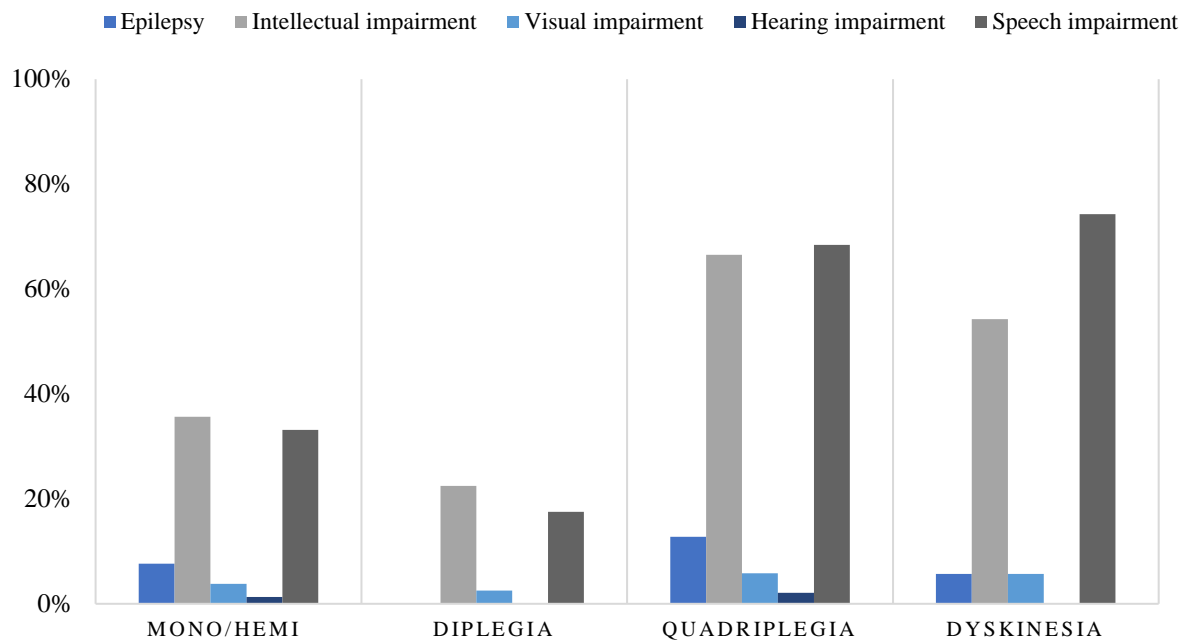


Figure S1. Associated impairments across CP types and distribution.

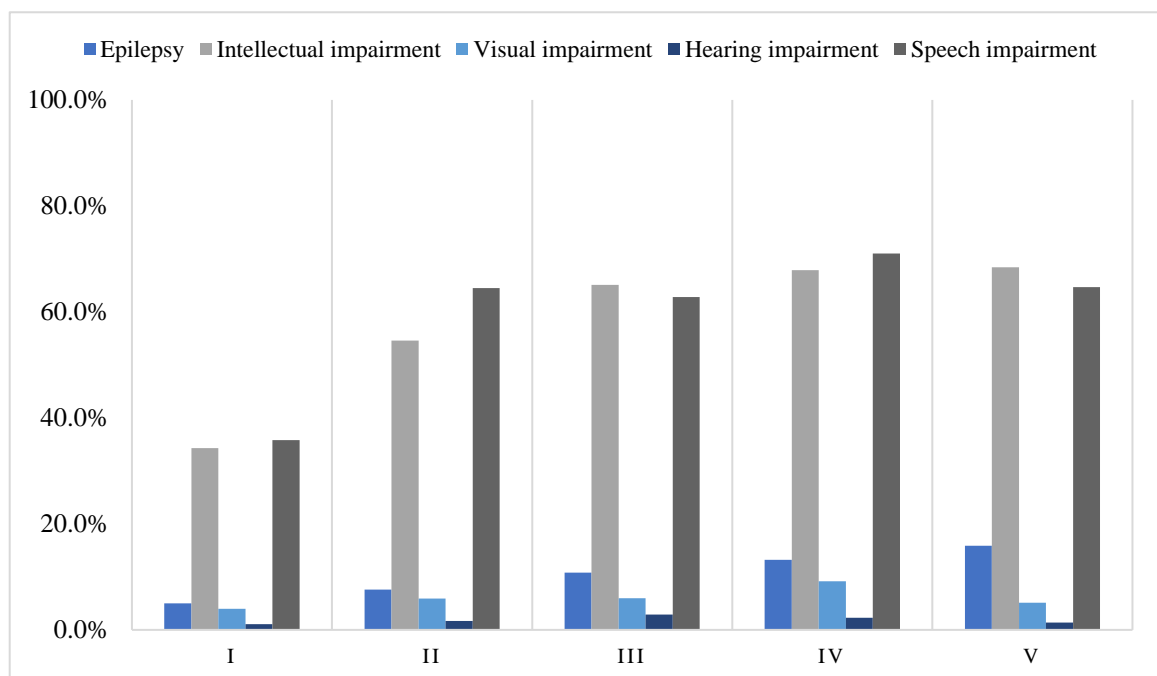


Figure S2. Associated impairments across GMFCS levels

Table 3. Association between associated impairments and factors (univariate logistic regression model).

Characteristics	Epilepsy			Intellectual impairment			Visual impairment			Hearing impairment			Speech impairment		
	Yes (n=82)	No (n=676)	Univariate OR (95%CI)	Yes (n=439)	No (n=320)	Univariate OR (95%CI)	Yes (n=41)	No (n=702)	Univariate OR (95%CI)	Yes (n=13)	No (n=747)	Univariate OR (95%CI)	Yes (n=450)	No (n=312)	Univariate OR (95%CI)
Male	50/82 (61.0)	434/676 (64.2)	1.15 (0.72-1.84)	286/439 (65.2)	201/320 (62.8)	0.90 (0.67-1.22)	28/41 (68.3)	444/702 (63.2)	0.8 (0.41-1.57)	5/13 (38.5)	482/747 (64.6)	2.92 (0.95-9.02)	294/450 (65.3)	195/312 (62.7)	0.9 (0.66-1.20)
Female	32/82 (39.0)	242/676 (35.8)		153/439 (34.9)	119/320 (37.2)		13/41 (31.7)	258/702 (36.8)		8/13 (61.5)	264/747 (35.4)		156/450 (34.7)	116/312 (37.3)	
Type of CP															
Spastic															
Mono/hemi	12/82 (14.6)	145/676 (21.5)	0.63 (0.33-1.19)	56/439 (12.8)	101/320 (31.6)	0.32 (0.22-0.46)***	6/41 (14.6)	151/702 (21.5)	0.63 (0.26-1.52)	2/13 (15.4)	155/747 (20.8)	0.69 (0.15-3.17)	52/450 (11.6)	105/312 (33.7)	0.26 (0.18-0.37)***
Diplegia	0	39/676 (5.8)	-	9/439 (2.1)	30/320 (9.4)	0.20 (0.09-0.43)***	1/41 (2.4)	39/702 (5.6)	0.43 (0.06-3.18)	0	40/747 (5.35)	-	7/450 (1.6)	33/312 (10.6)	0.13 (0.06-0.31)***
Quadriplegia	68/82 (82.9)	458/676 (67.8)	2.31 (1.27-4.20)**	354/439 (80.6)	173/320 (54.1)	3.54 (2.56-4.89)***	31/41 (75.6)	482/702 (68.6)	1.42 (0.68-2.95)	11/13 (84.6)	515/747 (68.9)	2.48 (0.54-11.3)	364/450 (80.9)	164/312 (52.6)	3.82 (2.76-5.28)***
Ataxia	0	1/676 (0.15)	-	1/439 (0.23)	0	-	1/41 (2.44)	0	-	0	1/747 (0.13)	-	1/450 (0.22)	0	-
Dyskinesia	2/82 (2.4)	33/676 (4.9)	0.49 (0.11-2.07)	19/439 (4.3)	16/320 (5.0)	0.86 (0.44-1.70)	2/41 (4.9)	30/702 (4.3)	1.15 (0.27-4.99)	0	35/747 (4.7)	-	26/450 (5.78)	9/312 (2.88)	2.06 (0.95-4.47)
Associated impairments															
Epilepsy				67/436 (15.4)	15/317 (4.7)	3.66 (2.05-6.53)***	7/41 (17.1)	72/698 (10.3)	1.79 (0.77-4.18)	3/12 (25)	77/742 (10.4)	2.88 (0.76- 10.9)	59/446 (13.23)	22/310 (7.1)	2.0 (1.19-3.33)
Intellectual	67/82 (81.7)	369/671 (55.0)	3.66 (2.05-6.53)***				33/41 (80.5)	392/698 (56.2)	3.22 (1.47-7.07)**	12/13 (92.3)	423/742 (57)	9.05 (1.17-69.96)*	331/447 (74.1)	106/310 (34.2)	5.49 (4.0-7.53)***
Visual	7/79 (8.9)	34/659 (5.2)	1.79 (0.76-4.18)	33/425 (7.8)	8/313 (2.6)	3.21 (1.46-7.05)**				1/12 (8.3)	39/727 (5.4)	1.6 (0.2-12.74)	30/435 (6.9)	10/306 (3.3)	2.19 (1.06-4.56)*
Hearing	3/80 (3.8)	9/673 (1.3)	2.87 (0.76-10.84)	12/435 (2.8)	1/319 (0.3)	9.02 (1.17-69.74)*	1/40 (2.5)	1/699 (0.3)	1.6 (0.2-12.74)				13/447 (2.91)	0	-
Speech	59/81 (72.8)	387/674 (57.4)	1.99 (1.19-3.32)**	331/437 (75.7)	116/319 (36.4)	5.46 (3.98-7.50)***	30/40 (75)	405/701 (57.8)	2.19 (1.06-4.56)*	13/13 (100)	434/745 (58.3)	-			
GMFCS level	52/81 (64.2)	297/667 (44.5)	2.23 (1.38-3.61)**	238/431 (55.2)	111/318 (34.9)	2.30 (1.71-3.10)***	20/40 (50)	320/694 (46.1)	1.17 (0.62-2.21)	6/13 (46.2)	343/736 (46.6)	0.98 (0.32-2.95)	234/440 (53.2)	115/311 (36.98)	1.93 (1.44-2.6)***

MACS level IV-V	3/20 (15.0)	15/168 (8.9)	1.80 (0.47-6.85)	15/95 (15.8)	3/91 (3.3)	5.50 (1.54-19.70)**	3/13 (23.1)	12/169 (7.1)	3.90 (0.95-16.2)*	0	18/184 (9.78)	-	16/97 (16.5)	2/91 (2.2)	8.79 (1.96-39.4)**
Neuroimaging patterns															
Normal	7/31 (22.6)	55/230 (23.9)	0.93 (0.38-2.27)	34/163 (20.9)	27/97 (27.8)	0.68 (0.38-1.22)	2/9 (22.2)	60/251 (23.9)	0.91 (0.18-4.5)	1/5 (20)	61/257 (23.7)	0.80 (0.09 – 7.32)	35/169 (20.7)	27/94 (28.7)	0.65 (0.36-1.16)
Miscellaneous	5/31 (16.1)	39/230 (17.0)	0.94 (0.34-2.60)	31/163 (19.0)	13/97 (13.4)	1.52 (0.75-3.07)	1/9 (11.1)	42/251 (16.7)	0.62 (0.08-5.11)	1/5 (20)	43/257 (16.7)	1.24 (0.14 – 11.4)	35/169 (20.7)	9/94 (9.6)	2.47 (1.13-5.4)*
Predominant grey matter injury	3/31 (9.7)	22/230 (9.6)	1.01 (0.28-3.60)	18/163 (11.0)	7/97 (7.2)	1.60 (0.64-3.97)	2/9 (22.2)	23/251 (9.2)	2.83 (0.56-14.4)	1/5 (20)	23/257 (8.95)	2.54 (0.27 – 23.7)	17/169 (10.1)	8/84 (8.51)	1.2 (0.5-2.9)
Predominant white matter injury	2/33 (6.1)	30/260 (11.5)	0.49 (0.11-2.17)	12/175 (6.9)	19/116 (16.4)	0.38 (0.17-0.81)	1/10 (10)	30/281 (10.7)	0.93 (0.11-7.59)	0	32/289 (11.1)	-	24/193 (12.4)	8/102 (7.84)	1.67 (0.72-3.86)
Maldevelopment s	4/31 (14.3)	10/230 (4.5)	3.26 (0.96-11.1)*	8/163 (4.9)	6/97 (6.2)	0.78 (0.26-2.33)	0	14/251 (5.6)	-	0	14/257 (5.5)	-	7/169 (4.14)	7/94 (7.5)	0.54 (0.18-1.58)
Maternal febrile illness during pregnancy	10/82 (12.2)	92/673 (13.7)	0.88 (0.44-1.76)	58/437 (13.3)	44/230 (13.8)	0.96 (0.63-1.46)	3/41 (7.3)	94/700 (13.9)	0.49 (0.15-1.62)	1/13 (7.7)	101/744 (13.6)	0.53 (0.07 – 4.12)	51/447 (11.4)	51/312 (16.4)	0.66 (0.43-1)
Mode of delivery															
Vaginal birth	53/82 (64.6)	448/668 (67.1)	0.90 (0.56-1.45)	291/433 (67.2)	291/318 (67.2)	1.06 (0.79-1.45)	25/40 (62.5)	464/695 (66.8)	0.83 (0.43-1.6)	8/13 (61.5)	492/738 (66.7)	0.8 (0.26 – 2.47)	298/445 (67)	204/308 (66.2)	1.03 (0.76-1.41)
Caesarean section	28/82 (34.1)	207/668 (31.0)	1.15 (0.71-1.88)	133/433 (30.7)	104/318 (32.7)	0.91 (0.67-1.24)	14/40 (35)	219/695 (31.5)	1.17 (0.6-0.08)	5/13 (38.5)	232/738 (31.4)	1.36 (0.44 – 4.21)	136/445 (30.6)	101/308 (32.8)	0.9 (0.66-1.23)
Gestational age															
Term (≥37–41 weeks)	60/82 (73.2)	477/674 (70.8)	1.13 (0.67-1.89)	323/437 (73.9)	213/320 (66.6)	1.42 (1.04-1.95)*	29/41 (70.7)	497/700 (71)	0.99 (0.49-1.97)	11/13 (84.6)	527/744 (70.8)	2.26 (0.50 – 10.3)	327/448 (73)	212/311 (68.2)	1.26 (0.92-1.73)
Preterm (≤36 weeks)	20/82 (24.4)	180/674 (26.7)	0.89 (0.52-1.51)	105/437 (24.0)	97/320 (30.3)	0.73 (0.53-1.01)	12/41 (29.3)	184/700 (26.3)	1.16 (0.58-2.32)	2/13 (15.4)	198/744 (26.6)	0.50 (0.11 - 2.28)	112/448 (25)	89/311 (28.6)	0.83 (0.6-1.15)
Birth weight															
Low birth weight (<2500gram)	16/82 (19.5)	182/673 (27.0)	0.65 (0.37-1.16)	111/437 (25.4)	89/319 (27.9)	0.88 (0.64-1.22)	16/41 (39.02)	181/699 (25.9)	1.83 (0.96-3.51)	2/13 (15.4)	196/743 (26.4)	0.51 (0.11 – 2.31)	116/447 (26)	84/311 (27.01)	0.95 (0.68-1.31)
Timing of injury causing CP															
Pre/ Perinatal	37/82 (45.1)	376/676 (55.6)	0.66 (0.41-1.04)	240/439 (54.7)	175/320 (54.7)	1.00 (0.75-1.34)	24/41 (58.5)	379/702 (53.9)	1.21 (0.64-2.29)	5/13 (38.5)	408/747 (54.6)	0.52 (0.17 – 1.60)	251/450 (55.80)	165/312 (52.9)	1.12 (0.84-1.5)

Postneonatal	28/82 (34.2)	69/676 (10.2)	4.56 (2.71-7.67)***	65/439 (14.8)	33/320 (10.3)	1.51 (0.97-2.36)	9/41 (22.0)	86/702 (12.2)	2.02 (0.93-4.37)	4/13 (30.8)	93/747 (12.5)	3.12 (0.94 – 10.3)	58/450 (12.89)	39/312 (12.5)	1.03 (0.67-1.6)
Unknown	17/82 (20.7)	231/676 (34.2)	0.50 (0.29-0.88)*	134/439 (30.5)	112/320 (35.0)	0.82 (0.60-1.11)	8/41 (19.5)	237/702 (33.7)	0.48 (0.22-1.05)	4/13 (30.8)	245/747 (32.8)	0.91 (0.28 – 2.98)	141/450 (31.3)	107/312 (34.3)	0.87 (0.64-1.19)
Perinatal asphyxia	34/81 (42.0)	239/673 (35.5)	1.31 (0.82-2.10)	162/435 (37.2)	113/320 (35.3)	1.09 (0.80-1.47)	21/41 (51.2)	243/699 (34.8)	1.97 (1.05-3.71)*	5/13 (38.5)	268/743 (36.1)	0.52 (0.17 – 1.60)	184/446 (41.2)	91/312 (29.2)	1.71 (1.25-2.32)**
Neonatal jaundice	5/82 (6.1)	74/676 (11.0)	0.53 (0.21-1.35)	47/439 (10.7)	32/320 (10.0)	1.08 (0.67-1.73)	2/41 (4.9)	75/702 (10.7)	0.43 (0.10-1.81)	1/13 (7.7)	80/747 (10.7)	3.12 (0.94 – 10.3)	51/450 (11.3)	29/312 (9.3)	1.25 (0.77-2.02)
Maternal infection	9/82 (11.0)	58/676 (8.6)	1.31 (0.62-2.76)	44/439 (10.0)	25/320 (7.8)	1.31 (0.79-2.20)	3/41 (7.32)	61/702 (8.7)	0.83 (0.25-2.77)	3/13 (23.1)	65/747 (8.7)	0.91 (0.28 – 2.98)	47/450 (10.4)	22/311 (7.1)	1.53 (0.9-2.6)
Consanguinity	75/77 (97.4)	652/661 (98.6)	1.93 (0.41-9.11)	8/429 (1.9)	3/310 (1.0)	1.94 (0.51-7.34)	0	11/687 (1.6)	-	0	11/726 (1.52)	-	8/442 (1.4)	5/299 (1.7)	0.81 (0.24-2.68)
Multiple birth	75/79 (94.9)	611/648 (94.3)	0.88 (0.31-2.53)	17/429 (4.0)	24/310 (7.8)	0.50 (0.26-0.94)*	3/41 (7.32)	36/672 (5.4)	1.39 (0.41-4.74)	0	42/716 (5.87)	-	24/434 (5.5)	18/296 (6.1)	0.9 (0.48-1.7)

n (%) is presented for categorical variables.

Chi square test and Fisher's Exact test were used for comparison between groups and for *p*-value (2-sided). **p*<0.05, ***p*<0.01, ****p*<0.001

Table S1. Association between associated impairments and anthropometric characteristics (univariate logistic regression model).

Characteristics	Epilepsy			Intellectual			Visual			Hearing			Speech		
	Yes (n=82)	No (n=676)	Univariate OR (95%CI)	Yes (n=439)	No (n=320)	Univariate OR (95%CI)	Yes (n=41)	No (n=702)	Univariate OR (95%CI)	Yes (n=13)	No (n=747)	Univariate OR (95%CI)	Yes (n=450)	No (n=312)	Univariate OR (95%CI)
Weight-for-age z score															
Normal	54/79 (68.4)	465/652 (71.3)	1	283/425 (66.6)	237/307 (77.2)	1	25/40 (62.5)	484/676 (71.6)	1	6/13 (46.2)	515/719 (71.6)	1	304/441 (68.9)	217/293 (74.1)	1
Moderate underweight	13/79 (16.5)	125/652 (19.2)	0.90 (0.47-1.69)	92/425 (21.6)	47/307 (15.3)	1.63 (1.11-2.42)**	12/40 (30.0)	122/676 (18.1)	1.9 (0.93-3.9)	6/13 (46.2)	131/719 (18.2)	3.90 (1.25-12.4)*	87/441 (19.7)	52/293 (17.8)	1.19 (0.81-1.75)
Severe underweight	12/79 (15.2)	62/652 (9.5)	1.67 (0.84-3.29)	50/425 (11.8)	23/307 (7.5)	1.82 (1.08-3.07)**	3/40 (7.5)	70/676 (10.4)	0.83 (0.24-2.8)	1/13 (7.69)	73/719 (10.2)	1.18 (0.14-9.91)	50/441 (11.3)	24/293 (8.2)	1.49 (0.89-2.49)
Height-for-age z score															
Normal	48/78 (61.5)	391/632 (61.9)	1	239/417 (57.3)	199/295 (67.5)	1	20/40 (50.0)	410/656 (62.5)	1	9/13 (69.2)	432/698 (61.89)	1	244/415 (58.8)	197/298 (66.1)	1
Stunted	13/78 (16.7)	97/632 (15.4)	1.09 (0.57-2.10)	72/417 (17.3)	39/295 (13.2)	1.54 (1.00-2.37)	10/40 (25.0)	96/656 (14.6)	2.14 (0.97-4.71)	2/13 (15.4)	107/698 (15.3)	0.9 (0.19-4.21)	71/415 (17.1)	40/298 (13.4)	1.43 (0.93-2.2)
Moderate	9/78 (11.5)	93/632 (14.7)	0.79 (0.37-1.66)	72/417 (17.3)	31/295 (10.5)	1.93 (1.22-2.07)*	8/40 (20.0)	93/656 (14.2)	1.76 (0.75-4.13)	2/13 (15.4)	101/698 (14.5)	0.95 (0.2-4.47)	64/415 (15.4)	39/298 (13.1)	1.32 (0.85-2.06)

Severe	8/78 (10.3)	51/632 (8.1)	1.28 (0.57-2.85)	34/417 (8.1)	26/295 (8.8)	1.09 (0.63-1.88)	2/40 (5.0)	57/656 (8.7)	0.72 (0.16-3.16)	0	58/698 (8.3)	-	36/415 (8.67)	22/298 (7.4)	1.32 (0.75-2.31)
Weight-for-height z score															
Normal	229/35 1 (65.2)	167/225 (74.2)	1	231/349 (66.2)	163/226 (72.1)	1	19/31 (61.3)	368/531 (69.3)	1	8/10 (80)	388/565 (68.7)	1	229/351 (65.2)	167/225 (74.2)	1
Wasted	44/351 (12.5)	19/225 (8.4)	1.69 (0.95-3)	44/349 (12.6)	20/226 (8.8)	1.55 (0.88-2.73)	8/31 (25.8)	56/531 (10.6)	2.77 (1.16-6.62)*	1/10 (10)	62/565 (10.97)	0.78 (0.1- 6.36)	44/351 (12.5)	19/225 (8.4)	1.69 (0.95-3)
Moderate	56/351 (16)	23/225 (10.2)	1.78 (1.05-3)	51/349 (14.6)	29/226 (12.8)	1.24 (0.75-2.04)	1/31 (3.2)	75/531 (14.1)	0.26 (0.03-1.96)	1/10 (10)	77/565 (13.6)	0.63 (0.08-5.11)	56/351 (16)	23/225 (10.2)	1.78 (1.05-3)
Severe	22/351 (6.3)	16/225 (7.1)	1 (0.51-1.97)	23/349 (6.6)	14/226 (6.2)	1.16 (0.58-2.32)	3/31 (9.7)	32/531 (6)	1.82 (0.51-6.5)	0	38/565 (6.7)	-	22/351 (6.3)	16/225 (7.1)	1 (0.51-1.97)
Head circumference															
Normocephalic	156/38 4 (40.6)	110/243 (45.3)	1	145 (39.0)	120 (47.4)	1	12/32 (37.5)	249/580 (42.9)	1	6/10 (60)	261/616 (42.4)	1	156/384 (40.6)	110/243 (45.3)	1
Microcephalic	218/38 4 (56.8)	122/243 (50.2)	0.79 (0.57-1.1)	215 (57.8)	124 (49.0)	0.7 (0.5-0.97)	19/32 (59.4)	312/580 (53.8)	0.79 (0.38-1.66)	3/10 (30)	335/616 (54.4)	0.79 (0.38-1.66)	218/384 (56.8)	122/243 (50.2)	0.79 (0.57-1.1)
Macrocephalic	10/384 (2.6)	11/243 (4.5)	0.51 (0.21-1.23)	12 (3.2)	9 (3.6)	0.77 (0.31- 1.88)	1/32 (3.1)	19/580 (3.3)	0.86 (0.11-6.81)	1/10 (10)	20/616 (3.25)	0.86 (0.11-6.81)	10/384 (2.6)	11/243 (4.5)	0.51 (0.21-1.23)

n (%) is presented for categorical variables.

Chi square test and Fisher's Exact test were used for comparison between groups and for *p*-value (2-sided). **p*<0.05, ***p*<0.01