Sleep architecture in stroke patients compared to healthy individuals

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Objectives

The aim of this study was to examine sleep architecture of patients who suffered a stroke using a cohort of healthy individuals as a control group.

Methods

Subjects. The cohort of stroke patients consisted of patients of the 1st Department of Neurology of the Faculty of Medicine of the Comenius University in Bratislava and was recorded between 2014 and 2016. All of the data comes from polysomnography (PSG) recordings obtained at the day of diagnosis. In total 70 patients aged between 30 and 90 years were included.

The cohort of healthy individuals was made up of probands of the SIESTA project by Klosch et al, a database of 195 controls with 2 PSG recordings each of which were recorded between 1997 and 2000. In total 82 of these probands were included aged 30 to 90 years.
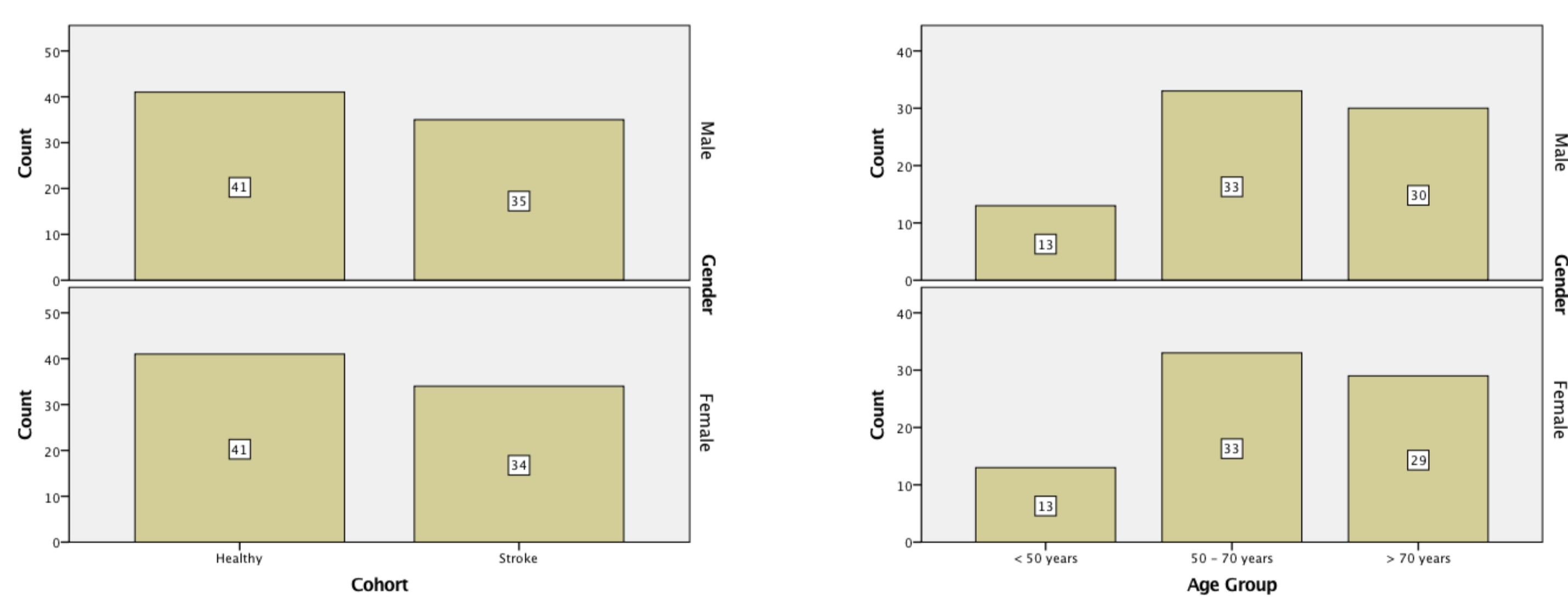
Matching. To better compare the results of both groups a matching according to 3 age groups as well as gender was performed. The age groups were defined as< 50 years, 50-70 years & >70 years old.

Statistical analysis. To examine the differences in average PSG parameters between the two cohorts independent samples *t*-tests were carried out. In order to counteract the problem of multiple comparisons Bonferroni correction of was applied.
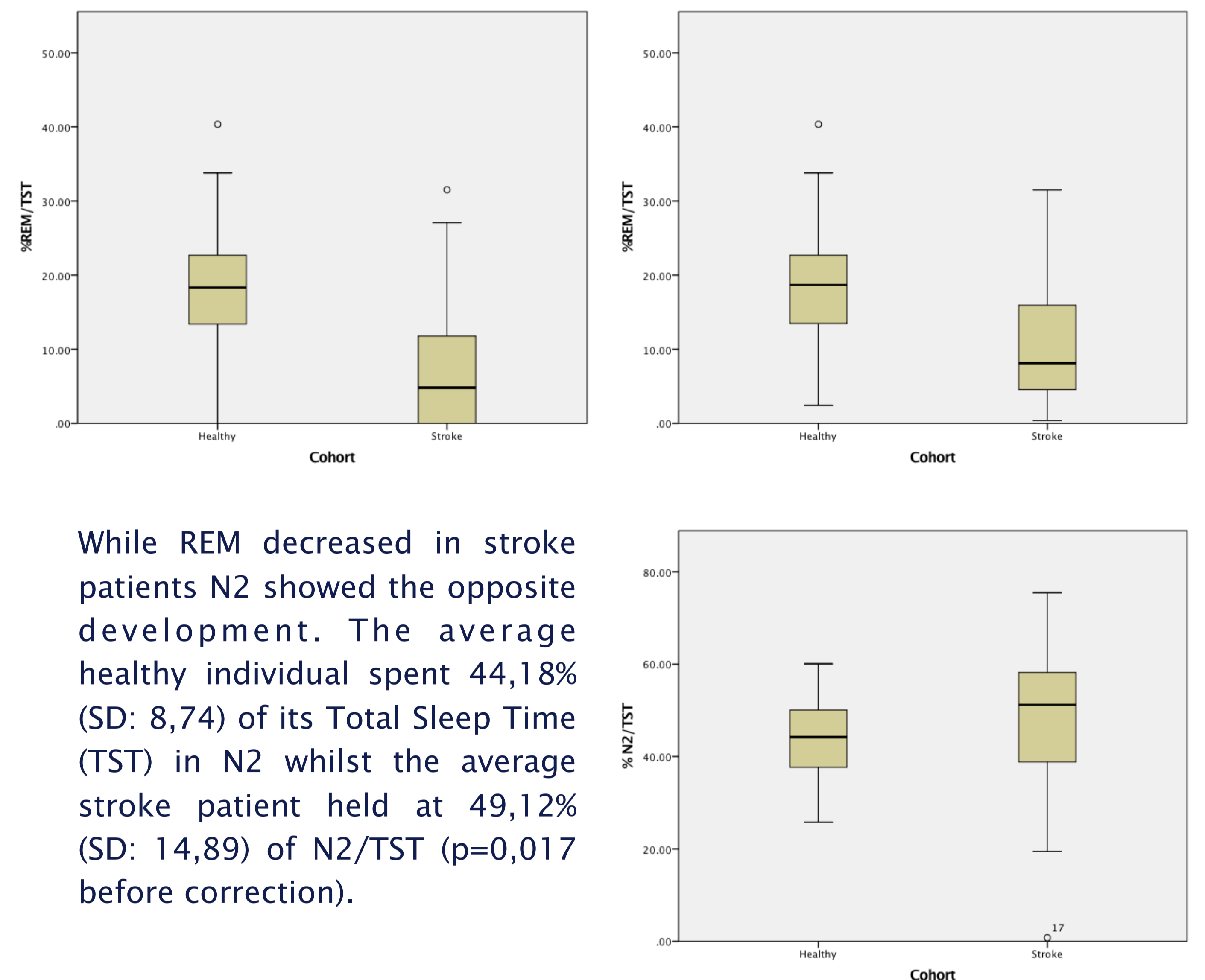
While REM decreased in stroke patients N2 showed the opposite development. The average healthy individual spent 44,18% (SD: 8,74) of its Total Sleep Time (TST) in N2 whilst the average stroke patient held at 49,12% (SD: 14,89) of N2/TST (p=0,017 before correction).

AASM-Parameters Healthy/Stroke							
Sleep-Parameter		N	Average	Standard Deviation	Standard Error	p-value	p-value Bonferroni corrected
TST	Healthy	82	365,54	57,53	6,35	< 0,001	< 0,001
	Stroke	69	299,58	105,20	12,66		
EFF	Healthy	82	76,90	11,55	1,28	0,030	0,390
	Stroke	69	70,45	21,95	2,64		
WTSP	Healthy	82	80,42	41,73	4,61	0,262	3,406
	Stroke	69	92,44	79,81	9,61		
FW	Healthy	82	27,79	10,14	1,12	0,708	9,204
	Stroke	69	26,97	15,63	1,88		
LN1	Healthy	82	19,63	20,04	2,21	0,126	1,638
	Stroke	69	26,72	33,51	4,03		
LN2	Healthy	82	26,26	23,60	2,61	0,074	0,962
	Stroke	69	36,27	40,70	4,90		
LN3	Healthy	80	60,53	51,42	5,75	0,508	6,604
	Stroke	63	66,80	61,52	7,75		
LR	Healthy	81	144,63	73,51	8,17	0,150	1,950
	Stroke	48	169,25	102,73	14,83		
SLAT	Healthy	82	21,53	20,76	2,29	0,265	3,445
	Stroke	69	26,72	33,51	4,03		
N1P	Healthy	82	20,96	8,37	0,92	0,019	0,247
	Stroke	69	26,52	17,83	2,15		
N2P	Healthy	82	44,18	8,74	0,96	0,017	0,221
	Stroke	69	49,12	14,89	1,79		
N3P	Healthy	82	16,58	11,23	1,24	0,739	9,607
	Stroke	69	17,27	14,48	1,74		
RP	Healthy	82	18,28	7,72	0,85	< 0,001	< 0,001
	Stroke	69	7,09	8,04	0,97		

Results

Stroke patients (SP) had significantly lower percentages of REM-sleep in Total Sleep Time (TST) when compared to healthy individuals (HI). The average of HI for REM was 18,28% (SD: 0,85) while the average SP only had 7,09% (SD: 0,97) of REM left. The corrected p-value for these averages was < 0,001. As 22 SP had no REM sleep at all the testing was repeated among HI and SP who showed REM>0 only delivering similar results: 18,51% (SD: 7,49) of REM in HI and 10,19% of REM in SP (p<0,001 after correction).

Conclusion

We present the first systematic comparison of sleep architecture of patients after stroke with that of healthy individuals. The findings presented here indicate that stroke strongly affects REM sleep possibly leading to a shift from REM towards more shallow sleep as seen by increasing N2 numbers in SPs. Sleep plays a crucial role in learning and relearning of motor functions and therefore might also be of big importance in the recovery of stroke patients. Further investigation of this matter is implicated.

Selected References

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