Supplementary Online Content

Misra S, Kasner SE, Dawson J, et al. Outcomes in patients with posttroke seizures: a systematic review and meta-analysis. JAMA Neurol. Published online September 18, 2023. doi:10.1001/jamaneurol.2023.3240

This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix 1: Detailed search strategy
Ovid MEDLINE(R) ALL

1	cerebrovascular disorders/ or basal ganglia cerebrovascular disease/ or exp brain ischemia/ or carotid artery diseases/ or carotid artery thrombosis/ or intracranial arterial diseases/ or cerebral arterial diseases/ or exp "intracranial embolism and thrombosis"/ or exp stroke/
2	(isch?emi$ adj6 (stroke$ or apoplex$ or cerebral vasc$ or cerebrovasc$ or cva or attack$)).tw,kf.
3	((brain or cerebr$ or cerebell$ or vertebrobasil$ or hemispher$ or intracran$ or intracerebral or infratentorial or supratentorial or middle cerebral artery or MCA$ or anterior circulation or posterior circulation or basilar artery or vertebral artery or space occupying) adj5 (isch?emi$ or infarct$ or thrombo$ or emboli$ or occlus$ or hypoxi$)).tw,kf.
4	1 or 2 or 3
5	((post* or after or following) adj6 (seizure* or convulsi* or epilep*)).tw,kf.
6	(exp epilepsy/ or exp seizures/) and ((post* or onset).tw,kf. or (after or following).ti.)
7	5 or 6
8	4 and 7
9	8 not (animals/ not (animals/ and humans/))

Embase (Ovid)

1	*cerebrovascular disease/ or *cerebral artery disease/ or *cerebrovascular accident/ or *stroke/ or *vertebrobasilar insufficiency/ or *carotid artery disease/ or exp *carotid artery obstruction/ or exp *brain infarction/ or exp *brain ischemia/ or exp *occlusive cerebrovascular disease/
2	(isch?emi$ adj6 (stroke$ or apoplex$ or cerebral vasc$ or cerebrovasc$ or cva or attack$)).tw,kw.
3	((brain or cerebr$ or cerebell$ or vertebrobasil$ or hemispher$ or intracran$ or intracerebral or infratentorial or supratentorial or middle cerebr$ or mca$ or anterior circulation) adj5 (isch?emi$ or infarct$ or thrombo$ or emboli$ or occlus$ or hypoxi$)).tw,kw.
4	1 or 2 or 3
5	((post* or after or following) adj6 (seizure* or convulsi* or epilep*)).tw,kw.
6	(exp *epilepsy/ or exp *seizures/) and ((post* or onset).tw,kw. or (after or following).ti.)
7	5 or 6
8	4 and 7
9	8 not ((exp animal/ or nonhuman/) not exp human/)
10	limit 9 to conference abstracts
11	9 not 10

APA PsycInfo <1806 to February Week 3 2022>

1	cerebrovascular disorders/ or cerebral hemorrhage/ or cerebral ischemia/ or cerebrovascular accidents/ or subarachnoid hemorrhage/
2	(stroke* or intracerebral h?emorrhage*).tw.

3	(isch?emi* adj6 (stroke* or apoplex* or cerebral vasc* or cerebrovasc* or cva or attack*)).tw.
4	((brain or cerebr* or cerebell* or vertebrobasil* or hemispher* or intracran* or intracerebral or infratentorial or supratentorial or middle cerebral artery or MCA* or anterior circulation or posterior circulation or basilar artery or vertebral artery or space occupying) adj5 (isch?emi* or infarct* or thrombo*or emboli* or occlus* or hypoxi*)).tw.
5	1 or 2 or 3 or 4
6	((post* or after or following) adj6 (seizure* or convulsi* or epilep*)).tw.
7	(exp epilepsy/ or exp seizures/) and ((post* or onset).tw. or (after or following).ti.)
8	6 or 7
9	5 and 8
10	9 not (animal not human).po.
11	limit 10 to ("0200 book" or "0240 authored book" or "0280 edited book" or "0300 encyclopedia" or "0400 dissertation abstract")
12	10 not 11

Web of Science

1	TI=((post* or after or following) NEAR/6 (seizure* or convulsi* or epilep*)) OR AB==((post* or after or following) NEAR/6 (seizure* or convulsi* or epilep*)) OR AK==((post* or after or following) NEAR/6 (seizure* or convulsi* or epilep*))
2	TI=((brain or cerebr* or cerebell* or vertebrobasil* or hemispher* or intracran* or intracerebral or infratentorial or supratentorial or “middle cerebral artery” or MCA* or “anterior circulation” or “posterior circulation” or “basilar artery” or “vertebral artery” or “space occupying”) NEAR/5 (isch?emi* OR infarct* OR thrombo* OR emboli* or occlus* or hypoxi*)) OR AB=((brain or cerebr* or cerebell* or vertebrobasil* or hemispher* or intracran* or intracerebral or infratentorial or supratentorial or “middle cerebral artery” or MCA* or “anterior circulation” or “posterior circulation” or “basilar artery” or “vertebral artery” or “space occupying”) NEAR/5 (isch?emi* OR infarct* OR thrombo* OR emboli* or occlus* or hypoxi*)) OR AK=((brain or cerebr* or cerebell* or vertebrobasil* or hemispher* or intracran* or intracerebral or infratentorial or supratentorial or “middle cerebral artery” or MCA* or “anterior circulation” or “posterior circulation” or “basilar artery” or “vertebral artery” or “space occupying”) NEAR/5 (isch?emi* OR infarct* OR thrombo* OR emboli* or occlus* or hypoxi*))
3	TI=(stroke* or “intracerebral h?emorrhage*”) OR AB=(stroke* or “intracerebral h?emorrhage*”) OR AK=(stroke* or “intracerebral h?emorrhage*”)
4	TI=(isch?emi* NEAR/6 (stroke* or apoplex* or “cerebral vasc*” or cerebrovasc* or cva or attack*)) OR AB=(isch?emi* NEAR/6 (stroke* or apoplex* or “cerebral vasc*” or cerebrovasc* or cva or attack*)) OR AK=(isch?emi* NEAR/6 (stroke* or apoplex* or “cerebral vasc*” or cerebrovasc* or cva or attack*))
5	#2 OR #3 OR #4
6	#1 and #5
7	#1 AND #5 and Meeting Abstracts (Exclude – Document Types)

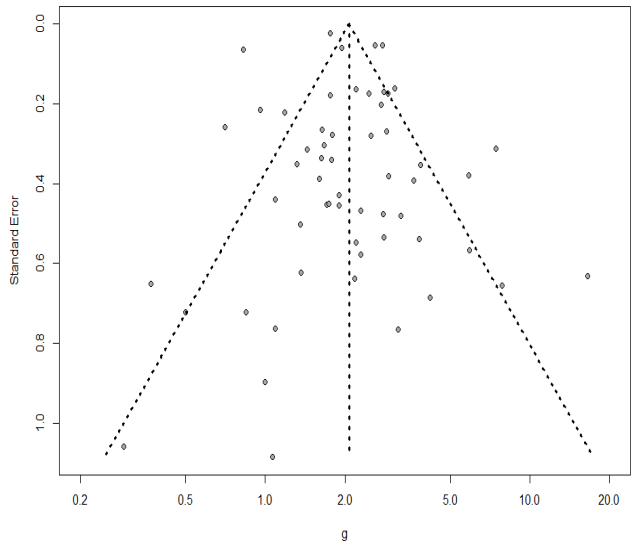
Cochrane

#1	((post* or after or following) NEAR/6 (seizure* or convulsi* or epilep*)):ti,ab,kw
#2	[mh ^"cerebrovascular disorders"] or [mh ^"basal ganglia cerebrovascular disease"] or [mh "brain ischemia"] or [mh ^"carotid artery diseases"] or [mh ^"carotid artery thrombosis"] or [mh ^"carotid artery, internal, dissection"] or [mh ^"stroke, lacunar"] or [mh ^"intracranial arterial diseases"] or [mh ^"cerebral arterial diseases"] or [mh ^"infarction, anterior cerebral artery"] or [mh ^"infarction, middle cerebral artery"] or [mh ^"infarction, posterior cerebral artery"] or [mh "intracranial embolism and thrombosis"] or [mh ^stroke] or [mh "brain infarction"] or [mh ^"vertebral artery dissection"]
#3	((brain or cerebr* or cerebell* or vertebrobasil* or hemispher* or intracran* or intracerebral or infratentorial or supratentorial or middle cerebr* or mca* or anterior circulation) near/5 (isch*emi* or infarct* or thrombo* or emboli* or occlus* or hypoxi*)):ti,ab,kw
#4	(isch*emi* near/6 (stroke* or apoplex* or cerebral vasc* or cerebrovasc* or cva or attack*)):ti,ab,kw
#5	#2 or #3 or #4
#6	#1 and #5
	Cochrane Database of Systematic Reviews Issue 3 of 12, March 2022
	Cochrane Central Register of Controlled Trials Issue 2 of 12, February 2022

eFigure 1: The list of countries representing the number of studies included in our systematic review and meta-analysis.

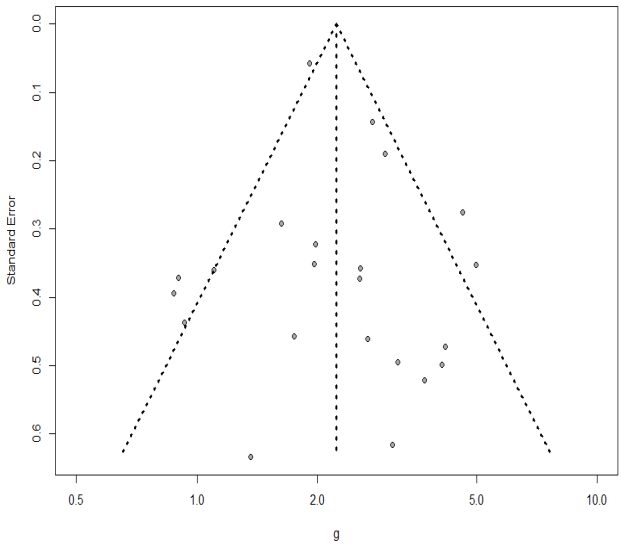
Our systematic review included 9 studies from United States of America, five each from Italy, Netherlands, and Taiwan, three each from Belgium, Canada, Egypt, France, Germany, and Sweden, two each from China, Brazil, Finland, Japan, Norway, Spain, Switzerland, and United Kingdom, and, one each from Australia, Hong Kong, India, Iran, Lebanon, Nigeria, Portugal, Qatar, Russia, Saudi Arabia, and Thailand, and one multicentric study from Australia, Canada, Israel, and Italy, and one from Australia, Chile, China, Japan, and UK.

(a) Mortality



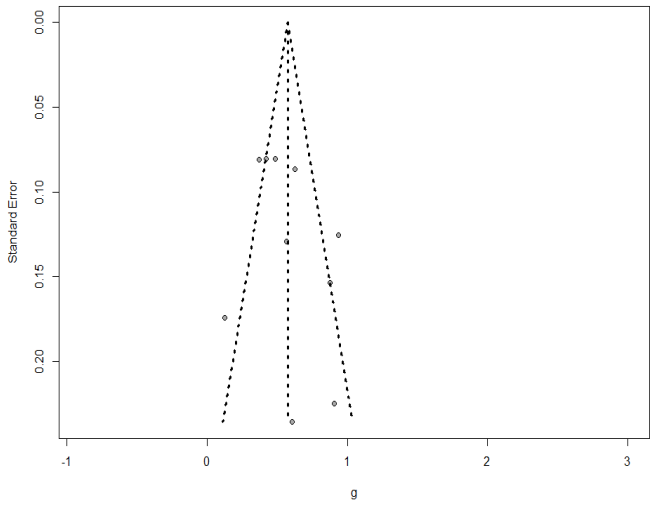
P-value: 0.40

(b) Poor outcome



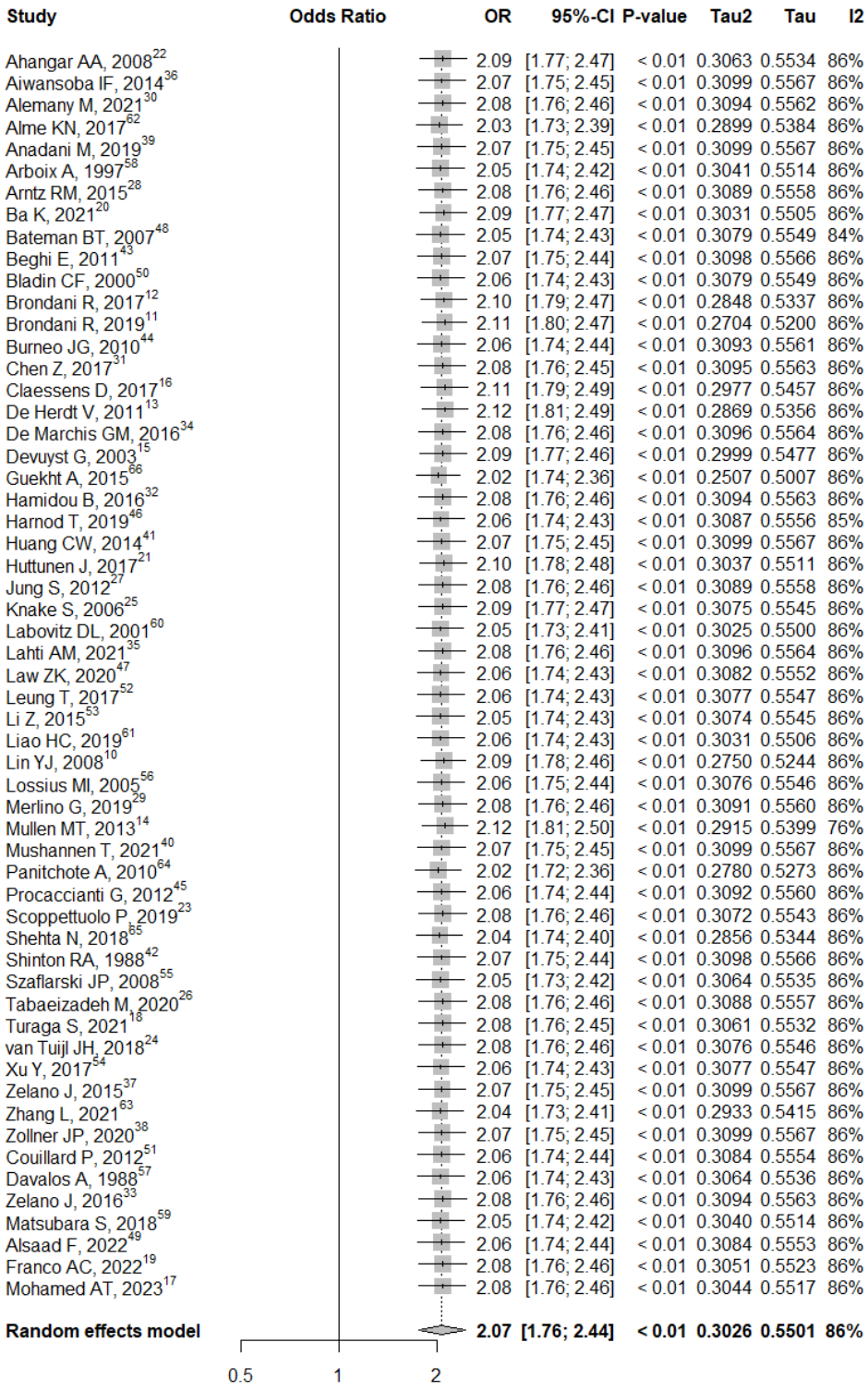
P-value: 0.43

(c) Disability

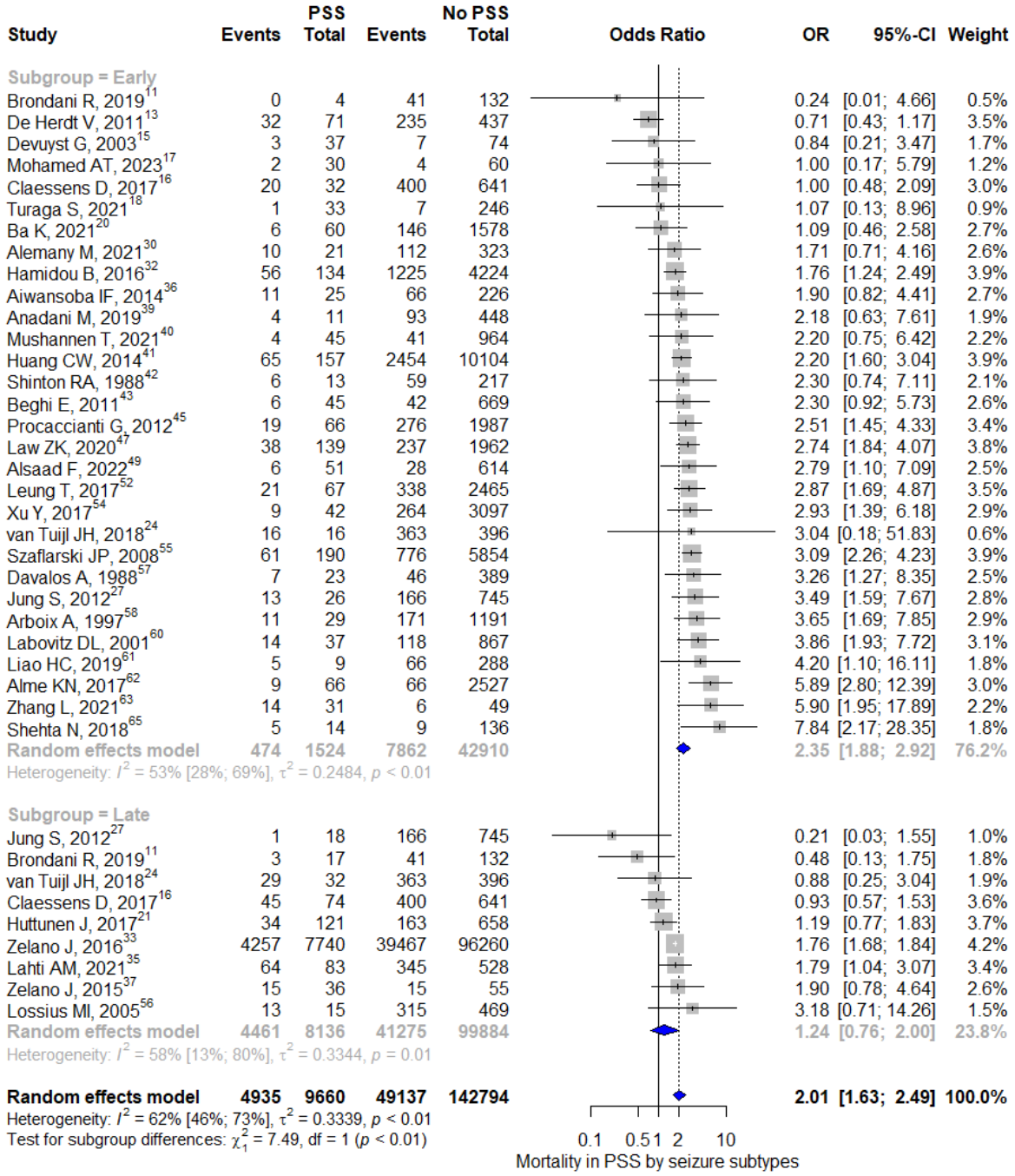


P-value: 0.27

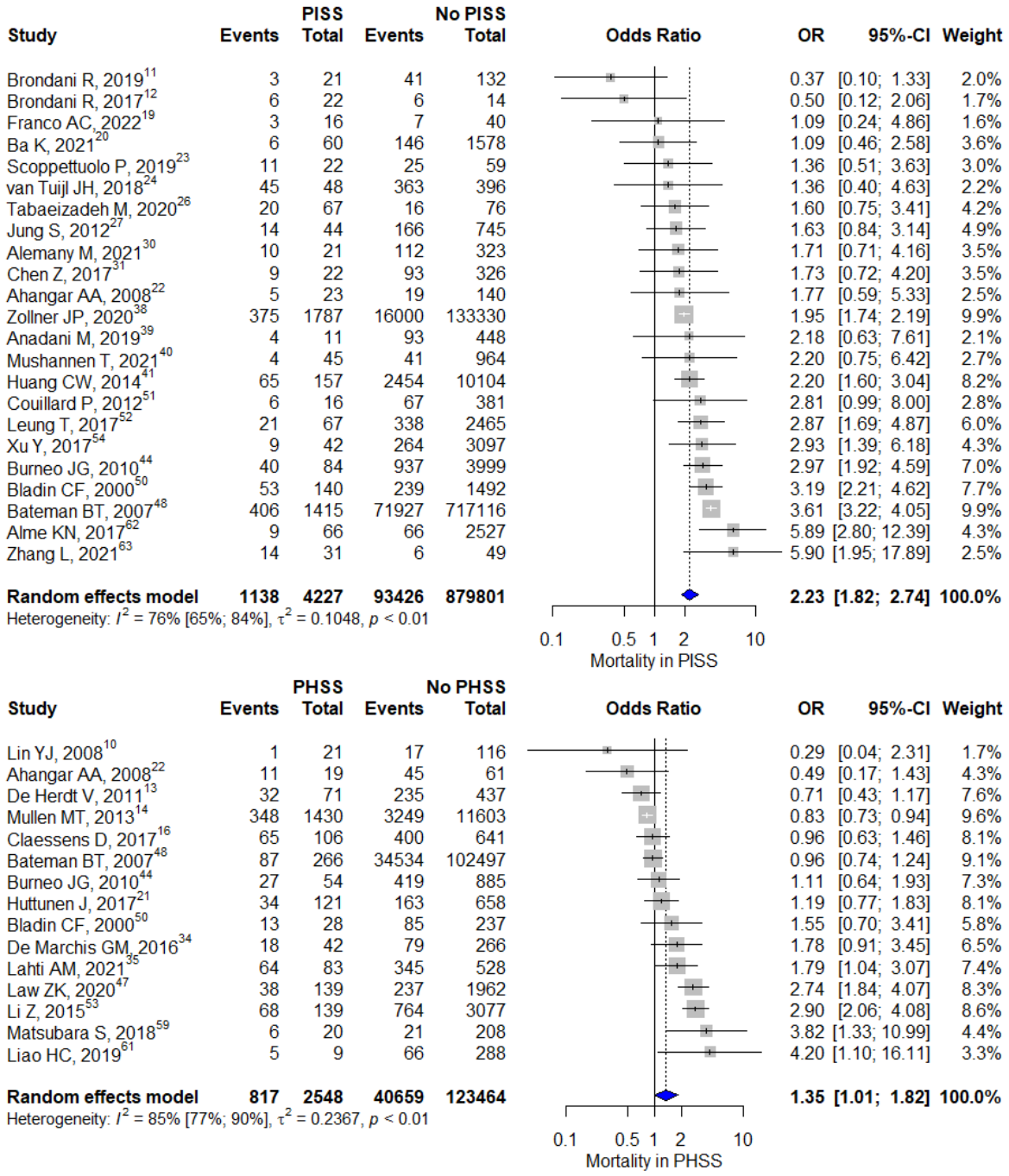
eFigure 2: Funnel plot to test the presence of publication bias for the association of PSS with various outcome measures.



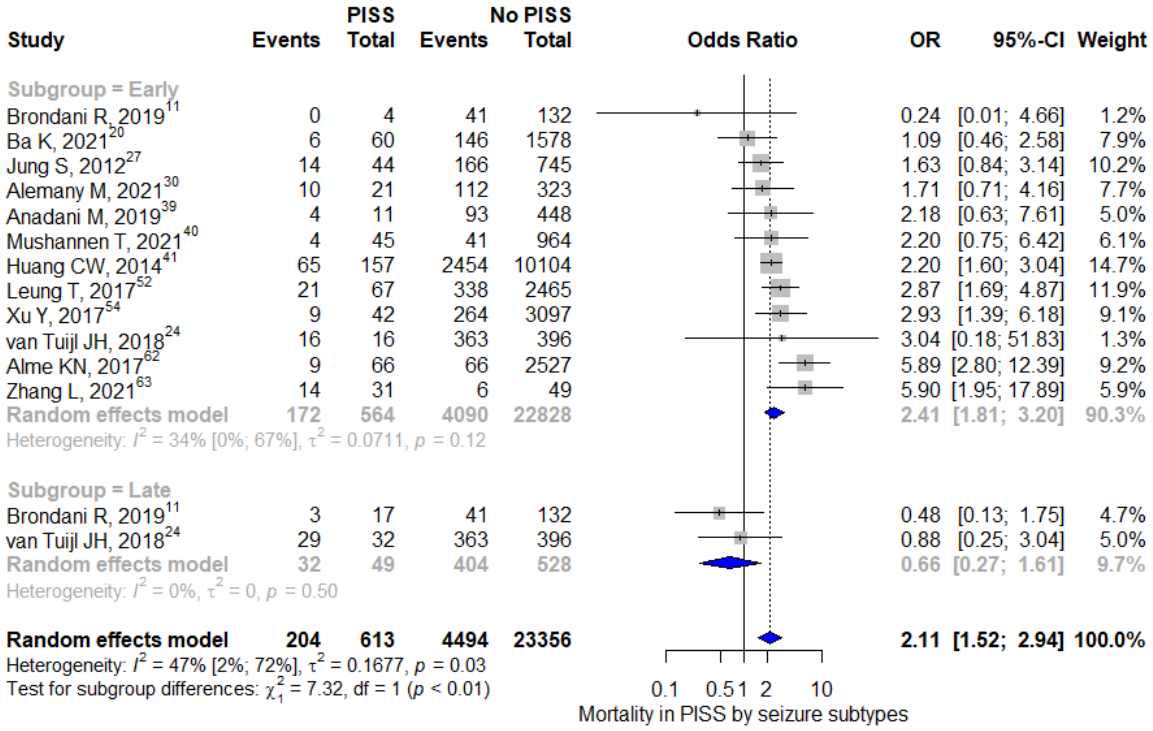
eFigure 3: Sensitivity analysis using the leave-one-out method for the association of PSS with mortality.

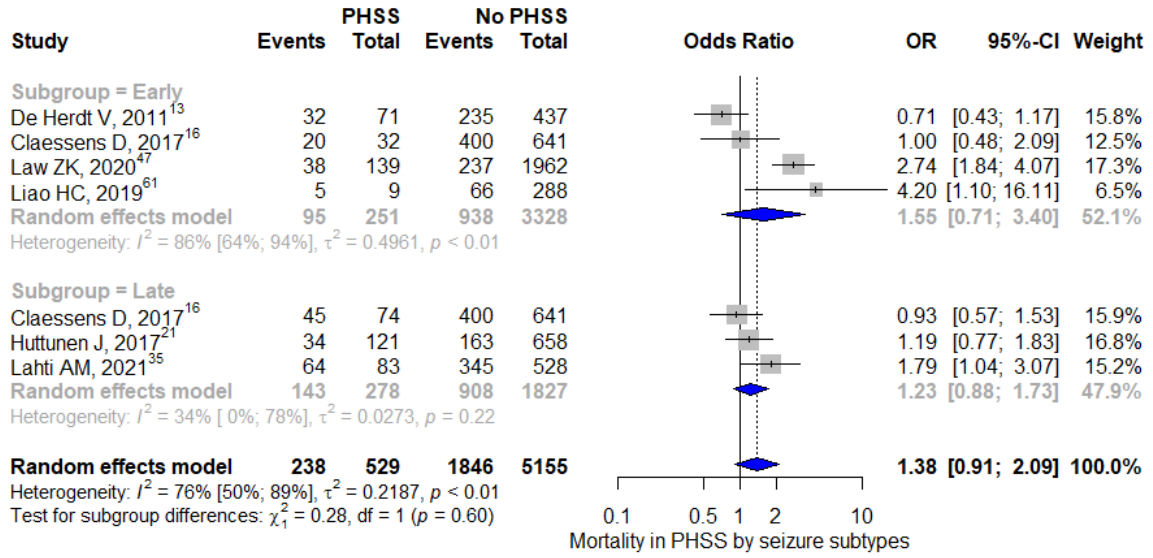


eFigure 4: Subgroup analysis based on seizure subtypes for the association of PSS with mortality.

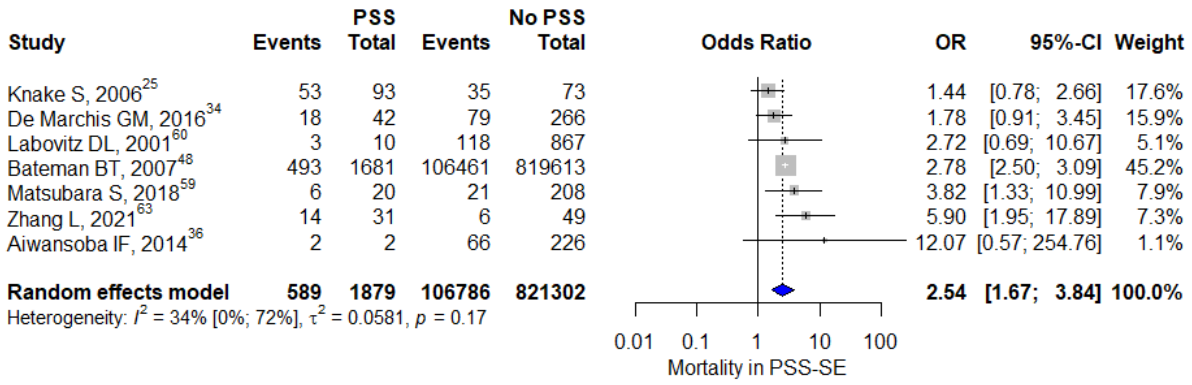


eFigure 5: Subgroup analysis based on stroke subtypes [(a) ischemic stroke, (b) hemorrhagic stroke] for the association of PSS with mortality.

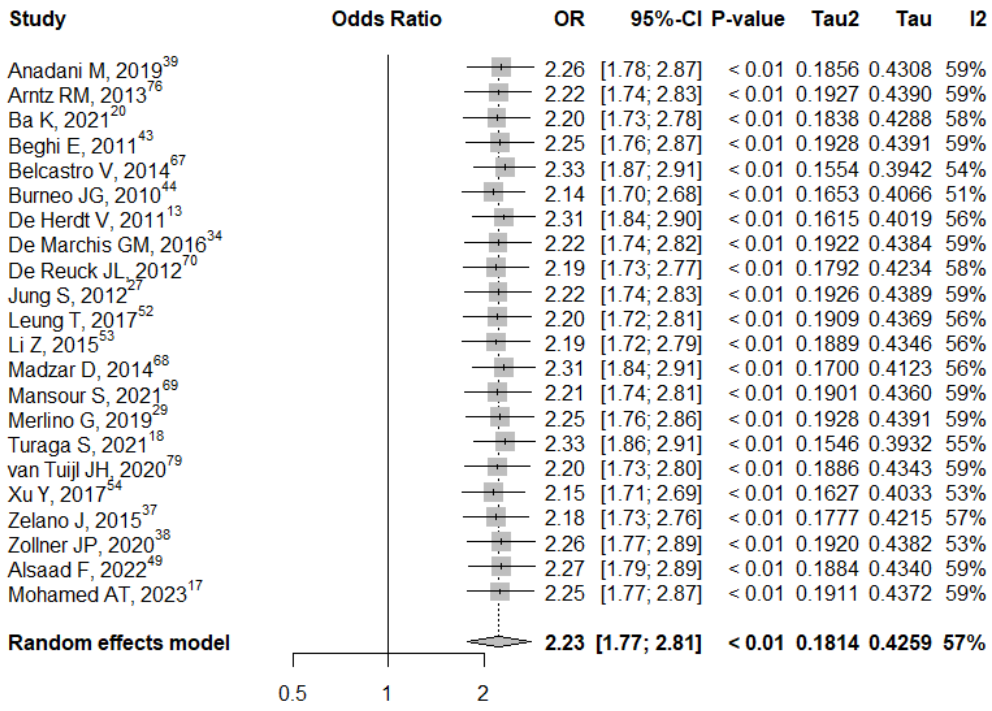




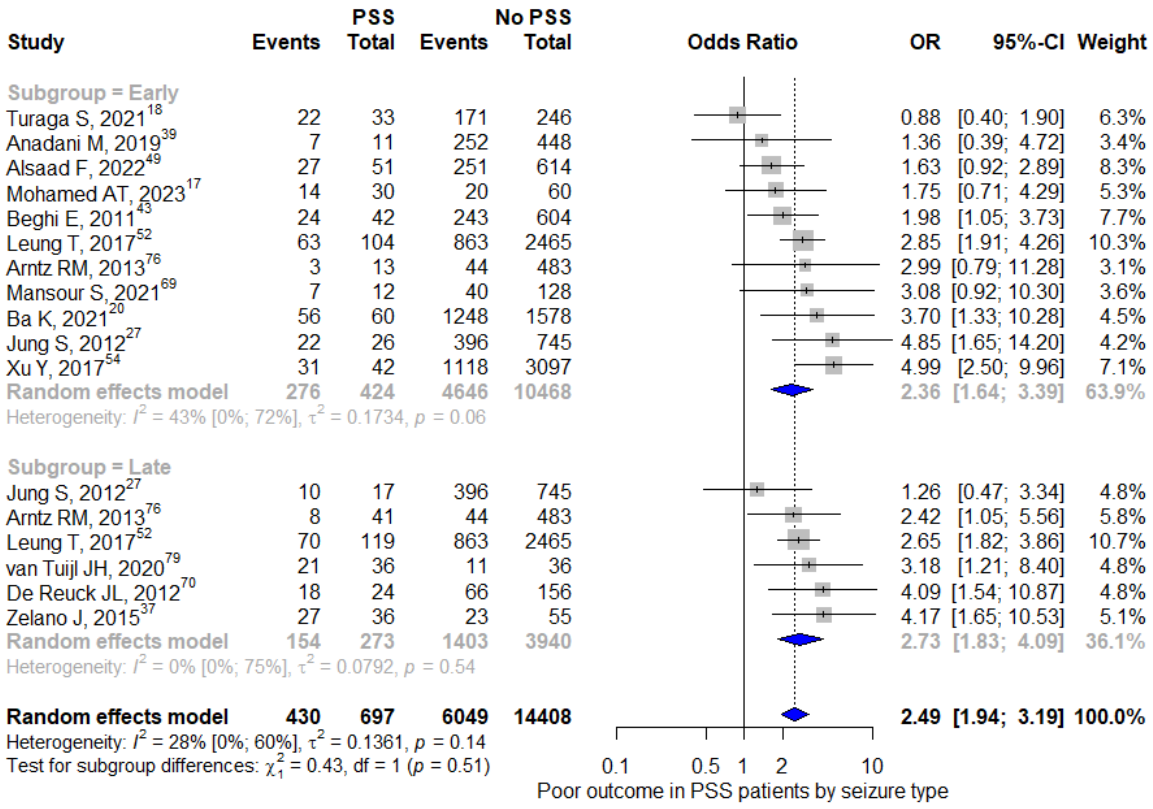
eFigure 6: Subgroup analysis based on seizure and stroke subtypes for the association of (a) post-ischemic stroke seizures and (b) post-hemorrhagic stroke seizures with mortality.



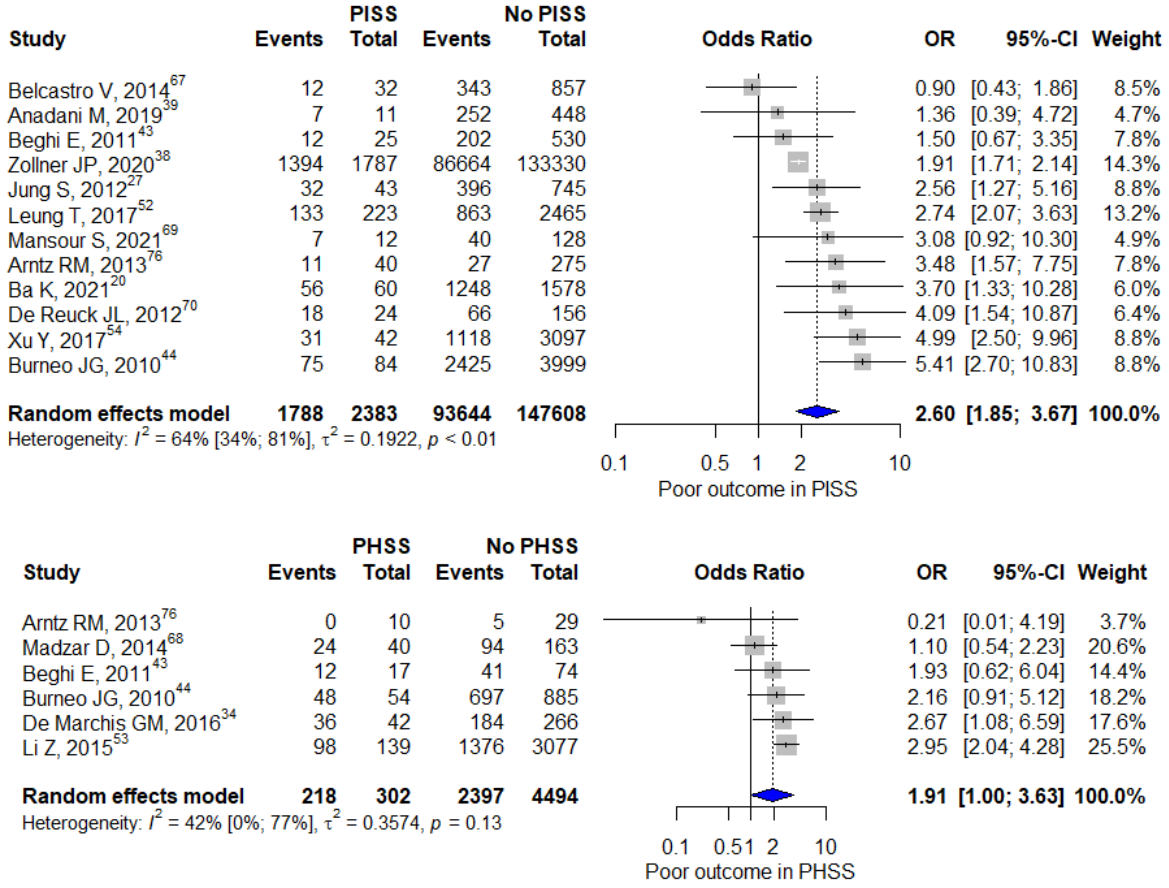
eFigure 7: Subgroup analysis on patients with status epilepticus for the association of PSS with mortality.



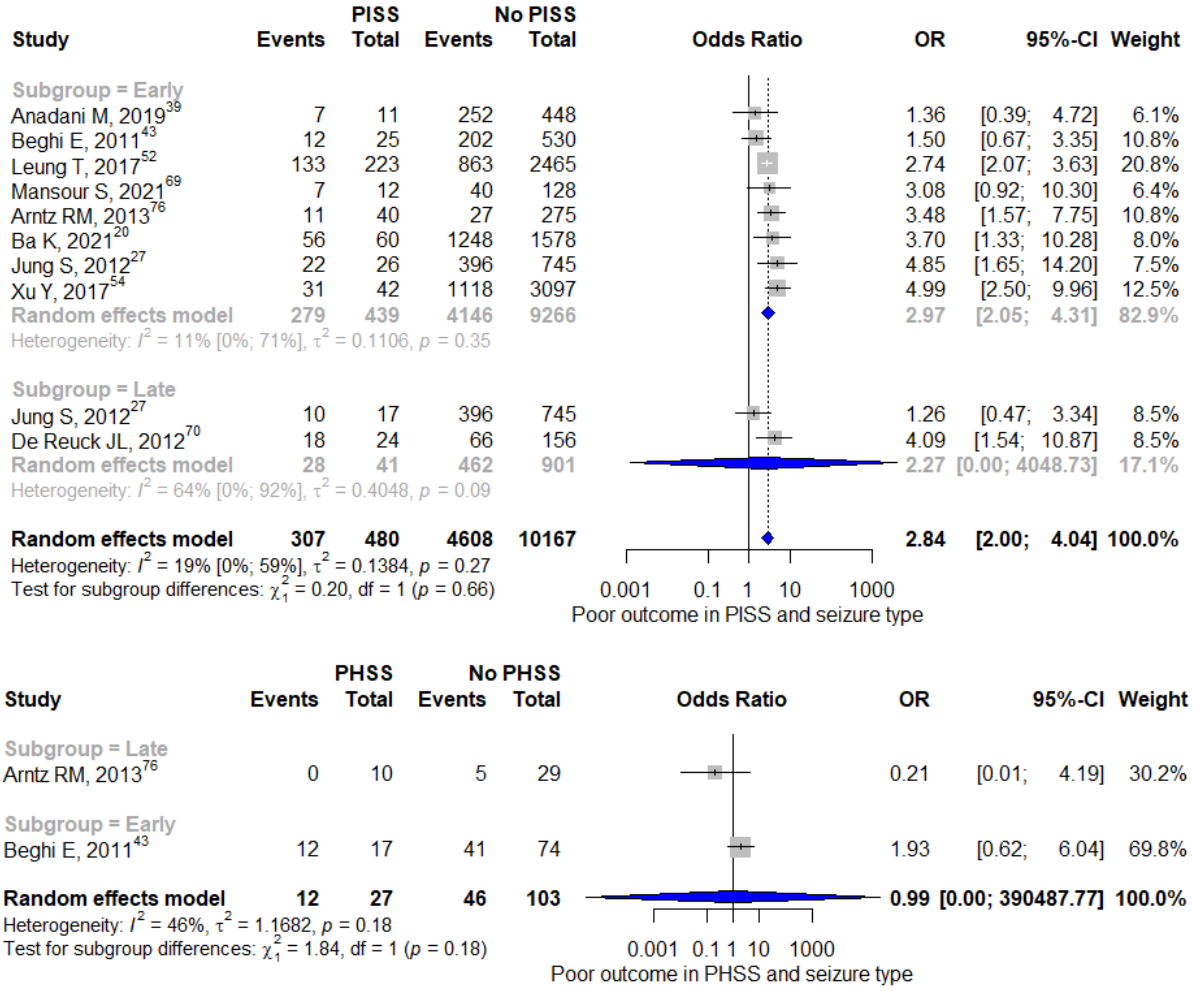
eFigure 8: Sensitivity analysis using the leave-one-out method for the association of PSS with poor outcome.



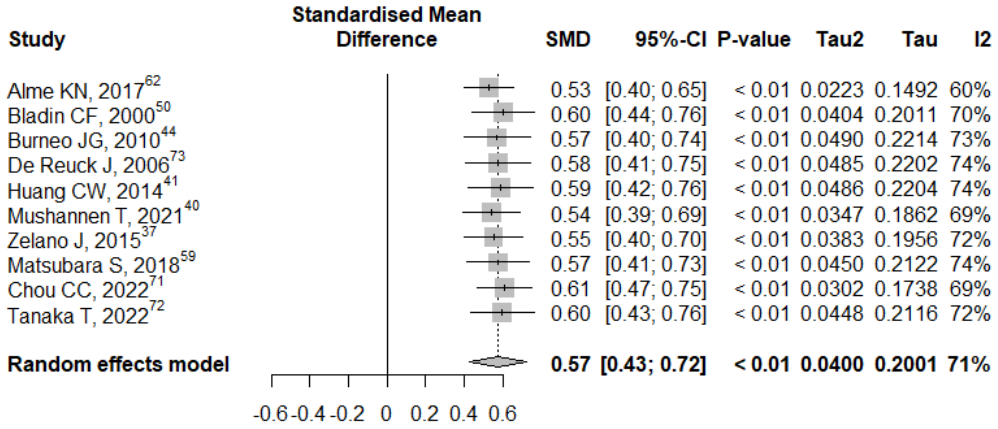
eFigure 9: Subgroup analysis based on seizure subtypes for the association of PSS with poor outcome.



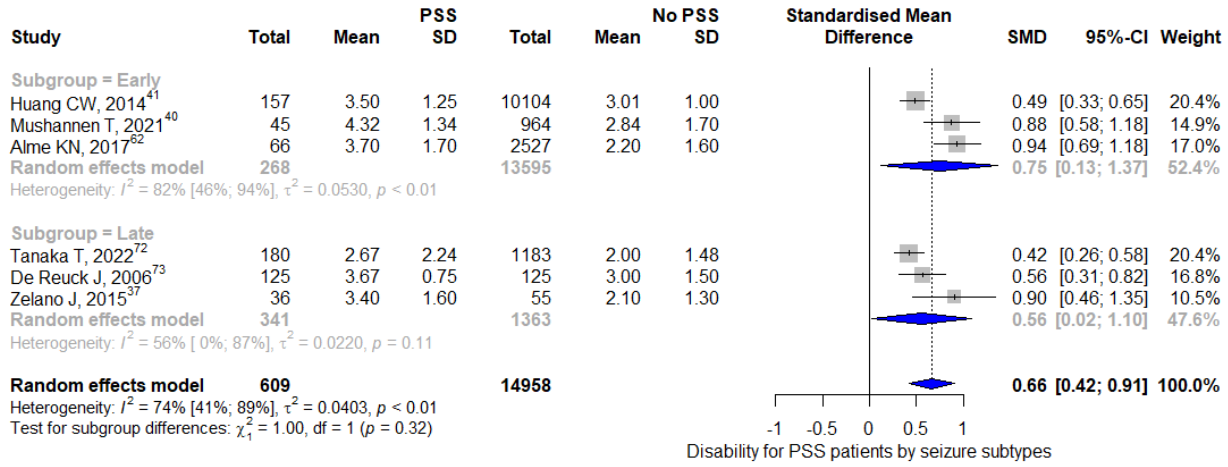
eFigure 10: Subgroup analysis based on stroke subtypes [(a) ischemic stroke, (b) hemorrhagic stroke] for the association of PSS with poor outcome.



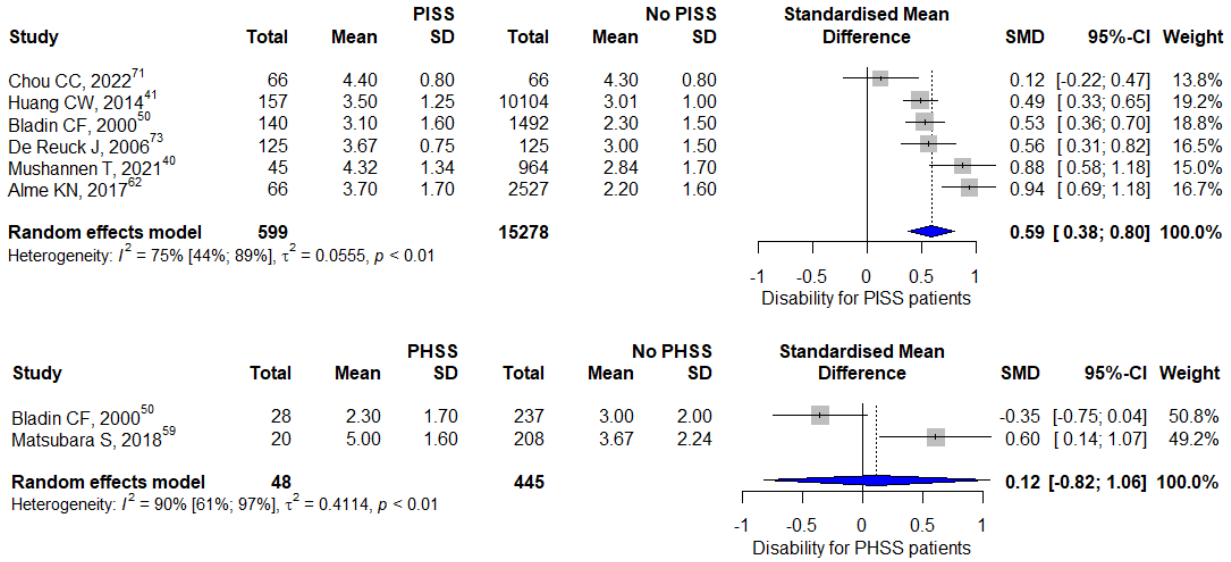
eFigure 11: Subgroup analysis based on seizure and stroke subtypes for the association of (a) post-ischemic stroke seizures and (b) post-hemorrhagic stroke seizures with poor outcome.



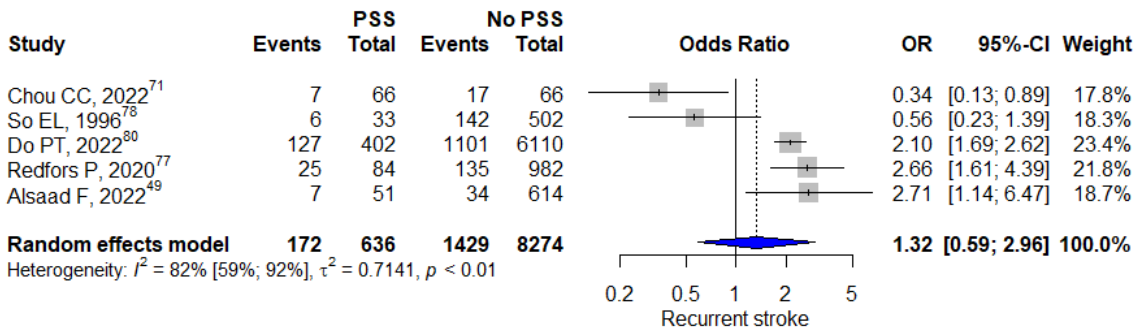
eFigure 12: Sensitivity analysis using the leave-one-out method for the association of PSS with disability.



eFigure 13: Subgroup analysis based on seizure subtypes for the association of PSS with disability.



eFigure 14: Subgroup analysis based on stroke subtypes [(a) ischemic stroke, (b) hemorrhagic stroke] for the association of PSS with disability.



eFigure 15: Association of PSS with recurrent stroke

eTable 1: Definition of early and late seizures used by the studies included in the systematic review

S. No	Author	Cases (PSS)	Early seizures	Late seizures	Definition-Early seizures	Definition-Late seizures	ILAE definition criteria
1	Ahangar AA, 2008	42	15	27	≤ 7 days	> 7 days	Not used
2	Aiwansoba IF, 2014	25	25	-	≤ 7 days	NA	Not used
3	Alemany M, 2021	21	21	-	≤ 7 days	NA	Used 2014
4	Alme KN, 2017	66	66	-	≤ 7 days	NA	Not used
5	Anadani M, 2019	11	11	-	≤ 7 days	NA	Not used
6	Arboix A, 1997	29	29	-	≤ 48 hours	NA	Not used
7	Arntz RM, 2013	54	13	41	≤ 7 days	> 7 days	Used 2005
8	Arntz RM, 2015	76	21	55	≤ 7 days	> 7 days	Used 2005
9	Ba K, 2021	60	60	-	≤ 7 days	NA	Used 1993
10	Bateman BT, 2007	1681	-	-	Not defined	Not defined	Not used
11	Beghi E, 2011	45	45	-	≤ 7 days	NA	Used 1993
12	Belcastro V, 2014	32	20	12	≤ 7 days	> 7 days	Not used
13	Bladin CF, 2000	168	99	69	≤ 2 weeks	> 2 weeks	Used 1981
14	Brondani R, 2017	22	13	9	Not defined	Not defined	Used 2014
15	Brondani R, 2019	21	4	17	≤ 7 days	> 7 days	Used 2014
16	Burneo JG, 2010	138	-	-	Not defined	Not defined	Used 1975
17	Chen Z, 2017	22	5	17	≤ 7 days	> 7 days	Used 2014
18	Claessens D, 2017	106	32	74	≤ 7 days	> 7 days	Used 2014
19	De Herdt V, 2011	71	71	-	≤ 7 days	NA	Used 2010
20	De Marchis GM, 2016	50	-	-	Not defined	Not defined	Not used
21	De Reuck J, 2006	125	-	125	NA	> 2 weeks	Not used
22	De Reuck JL, 2012	24	3	21	≤ 2 weeks	> 2 weeks	Not used
23	Devuyst G, 2003	37	37	-	≤ 24 hours	NA	Not used
24	Guekht A, 2015	30	27	3	≤ 7 days	> 7 days	Used 2005
25	Hamidou B, 2016	134	134	-	≤ 2 weeks	NA	Used 2010
26	Harnod T, 2019	1651	-	-	Not defined	Not defined	Used 2014

27	Huang CW, 2014	157	157	-	≤ 24 hours	NA	Used 2014
28	Huttunen J, 2017	121	-	121	NA	> 7 days	Used 2014
29	Jung S, 2012	44	26	18	≤ 24 hours	> 24 hours	Not used
30	Knake S, 2006	93	-	-	Not defined	Not defined	Not used
31	Labovitz DL, 2001	37	37	-	≤ 7 days	NA	Used 1993
32	Lahti AM, 2021	83	-	83	NA	> 2 weeks	Used 2005
33	Law ZK, 2020	163	163	-	≤ 7 days	NA	Not used
34	Leung T, 2017	223	104	119	≤ 7 days	> 7 days	Used 2014
35	Li Z, 2015	139	-	-	Not defined	Not defined	Used 2005
36	Liao HC, 2019	9	9	-	≤ 7 days	NA	Used 2010
37	Lin YJ, 2008	21	13	8	≤ 2 weeks	> 2 weeks	Used 1993
38	Lossius MI, 2005	15	-	15	NA	> 7 days	Used 1993
39	Madzar D, 2014	40	18	22	≤ 7 days	> 7 days	Used 1993
40	Mansour S, 2021	12	12	-	≤ 7 days	NA	Used 2010
41	Merlino G, 2019	51	-	-	Not defined	Not defined	Used 2010
42	Mullen MT, 2013	1430	-	-	Not defined	Not defined	Not used
43	Mushannen T, 2021	45	45	-	≤ 7 days	NA	Not used
44	Panitchote A, 2010	58	35	17	≤ 2 weeks	> 2 weeks	Not used
45	Procaccianti G, 2012	66	66	-	≤ 7 days	NA	Used 1981
46	Redfors P, 2020	84	-	84	NA	> 7days	Used 2014
47	Scoppettuolo P, 2019	22	-	-	Not defined	Not defined	Not used
48	Selim HA, 2009	8	8	-	≤ 48 hours	NA	Used 1993
49	Shehta N, 2018	14	14	-	≤ 7 days	NA	Used 1993
50	Shinton RA, 1988	13	13	-	≤ 24 hours	NA	Not used
51	So EL, 1996	33	33	-	≤ 7 days	NA	Used 1981
52	Szaflarski JP, 2008	190	190	-	≤ 24 hours	NA	Not used
53	Tabaeizadeh M, 2020	67	-	-	Not defined	Not defined	Not used
54	Turaga S, 2021	33	33	-	≤ 7 days	NA	Not used
55	van Tuijl JH, 2018	48	16	32	≤ 7 days	> 7 days	Used 2014
56	van Tuijl JH, 2020	36	-	36	NA	> 7 days	Not used

57	Xu Y, 2017	42	42	-	≤ 7 days	NA	Used 1981
58	Zelano J, 2015	36	-	36	NA	> 7 days	Used 2014
59	Zhang L, 2021	31	31	-	≤ 48 hours	NA	Not used
60	Zollner JP, 2020	1787	-	-	Not defined	Not defined	Not used
61	Couillard P, 2012	16	10	6	≤ 7 days	> 7 days	Used 1993
62	Davalos A, 1988	23	23	-	≤ 48 hours	NA	Not used
63	Zelano J, 2016	7740	-	7740	NA	> 7 days	Used 2014
64	Matsubara S, 2018	20	-	-	Not defined	Not defined	Not used
65	Alsaad F, 2022	51	51		≤ 7 days	NA	Not used
66	Chou CC, 2022	66	31	35	≤ 7 days	> 7 days	Not used
67	Do PT, 2022	402	-	-	Not defined	Not defined	Not used
68	Franco AC, 2022	16	6	9	≤ 7 days	> 7 days	Used 2014
69	Mohamed AT, 2023	30	30	-	Not defined	NA	Not used
70	Tanaka T, 2022	180	-	180	NA	> 7 days	Used 2014
71	Lekoubou A, 2022	1574	-	1574	Not defined	Not defined	Not used

Abbreviations: PSS- Post-stroke seizures; ILAE- International League Against Epilepsy; NA- Not available.

Early/late seizure classification: Early/late seizures were defined using the 7-day cut-off in 39 studies, 24-hour cut-off in five studies, 48-hour cut-off in four studies, and 14-day cut-off in seven studies. 16 studies did not classify seizures as early or late.

eTable 2: Baseline characteristics of studies included in the systematic review and meta-analysis

S. No	Author	Country	Study design	Early/ Late onset seizure	Stroke subtype	PSE/ no PSE	Age (PSS/ no PSS)	Males (PSS/ no PSS)	Follow up duration	Outcome measures
1	Mohamed AT, 2023[17]	Egypt	Retrospective cohort study	Early-30	IS + HS	30/ 60	53.23 (14.01)/ 60.07 (12.65)	13/ 29	In-hospital	Mortality, poor outcome
2	Alsaad F, 2022[49]	Saudi Arabia	Retrospective cohort study	Early-51	IS + HS	51/ 614	60.5 (13.8)/ 60.6 (12.5)	27/ 429	In-hospital	Mortality, poor outcome, recurrent stroke
3	Chou C, 2022[71]	Taiwan	Retrospective cohort study	Early-31, Late-35	IS	66/ 66	74.5 (13.7)/ 76.7 (11.6)	39/ 49	62.5 months (mean) (32-145)	Disability, recurrent stroke
4	Do PT, 2022[80]	Taiwan	Retrospective cohort study	NA	IS	402/ 6110	36.20 (6.76)/ 37.25 (6.09)	262/ 3935	8.3 years (mean)	Recurrent stroke
5	Franco AC, 2022[19]	Portugal	Retrospective cohort study	Early-6, Late-9, Both-1	IS	16/ 40	53.9 (8.95)/ 56.1 (11.5)	7/ 20	21 months (median)	Mortality
6	Lekoubou A, 2022[74]	USA	Retrospective cohort study	Late-1574	IS + HS	1574/ 22106	48.4 (9.4)/ 49.8 (8.2)	642/ 9762	5 years	Dementia
7	Tanaka T, 2022[72]	Japan	Retrospective cohort study	Late-180	IS + HS	180/ 1183	74 (64.3-82)/ 74 (65-81)	113/ 743	28.83 months (mean)	Disability
8	Alemany M, 2021[30]	Spain	Retrospective cohort study	Early-21	IS	21/ 323	69 ± 12/ 64 ± 11 (n=270)	12/ 153/270	5 years	Mortality
9	Ba K, 2021[20]	France	Retrospective cohort study	Early-60	IS	60/ 1578	71 (59–79)/ 71 (60–82)	39/ 744	7 days	Mortality, poor outcome
10	Lahti AM, 2021[35]	Finland	Ambispective cohort study	Late-83	HS (ICH)	83/ 528	65.2 (60.6-72.9)/ 66.8 (59.0-76.0)	47/ 287	8.8 (0.25-23.9) years	Mortality

11	Mansour S, 2021[69]	Lebanon	Retrospective cohort study	Early-12	IS	12/ 128	68.42 ± 9.89/ 65.98 ± 14.36	4/ 76	In-hospital	Poor outcome
12	Mushannen T, 2021[40]	Qatar	Case-control	Early-45	IS	45/ 964	57.8 ± 15.8/ 53 ± 13.4	NA/ NA	In-hospital	Mortality, disability
13	Turaga S, 2021[18]	India	Prospective cohort study	Early-33	IS + HS	33/ 246	38.88 ± 16.74/ 51.53 ± 16.69	20/ 167	In-hospital	Mortality, poor outcome
14	Zhang L, 2021[63]	China	Prospective cohort study	Early-31	IS	31/ 49	83 (74.0-87.0)/ 76 (64.5–86.5)	10/ 26	In-hospital	Mortality
15	Law ZK, 2020[47]	UK	Prospective cohort study	Early-163	HS (ICH)	163/ 2162	69.0 ± 13.3/ 68.9 ± 13.9	85/ 1216	3 months	Mortality
16	Redfors P, 2020[77]	Sweden	Retrospective cohort study	Late-84	IS	84/ 982	NA/ NA	7/ 68	8 (0-14) years	Recurrent stroke
17	Tabaeizadeh M, 2020[26]	USA	Retrospective cohort study	NA	IS	67/ 76	67 (56.5–77.8)/ 66 (49–77.5)	33/ 39	In-hospital	Mortality
18	van Tuijl JH, 2020[79]	Netherlands	Case-control	Late-36	IS + HS	36/ 36	63.4 ± 13.1/ 64.3 ± 12.4	26/ 28	NA	Poor outcome
19	Zollner JP, 2020[38]	Germany	Retrospective cohort study	NA	IS	1787/ 133330	75.4 ± 12.4/ 73.9 ± 12.7	827/ 67065	In-hospital	Mortality, poor outcome
20	Anadani M, 2019[39]	USA	Retrospective cohort study	Early-11	IS	11/ 448	62.55 ± 16.9/ 67.64 ± 14.5	7/ 223	3 months	Mortality, poor outcome
21	Brondani R, 2019[11]	Brazil	Retrospective cohort study	Early-4, Late-17	IS	21/ 132	67.05 ± 10.8/ 67.27 ± 13.5	11/ 68	2 years	Mortality
22	Harnod T, 2019[46]	Taiwan	Retrospective cohort study	NA	NA	1651/ 11952	69/ 69.8	966/ 6599	4.21 (range 0.003–14) years	Mortality
23	Liao HC, 2019[61]	Taiwan	Retrospective cohort study	Early-9	HS (ICH)	9/ 288	62 (59–65)/ 62 (50–76)	7/ 206	In-hospital	Mortality
24	Merlino G, 2019[29]	Italy	Prospective cohort study	Early, Late	IS + HS	51/ 584	72.3 ± 14.8/ 77.5 ± 11.5	21/ 276	2 years	Mortality, poor outcome

				(No data)						
25	Scoppettuolo P, 2019[23]	Belgium	Retrospective cohort study	NA	IS	22/ 59	71 (mean)/ 71 (mean)	13/ 33	3 months	Mortality
26	Shehta N, 2018[65]	Egypt	Prospective cohort study	Early-14	IS + HS (ICH)	14/ 136	65.2 ± 11.6/ 61.3 ± 13.5	8/ 87	In-hospital	Mortality
27	van Tuijl JH, 2018[24]	Netherlands	Prospective cohort study	Early-16, Late-32	IS	48/ 396	70.4 ± 12.1/ 71.83 ± 10.23	23/ 202	26 ± 0.9 years	Mortality
28	Matsubara S, 2018[59]	Japan	Retrospective cohort study	NA	HS	20/ 208	70.6 (11.9)/ 67.6 (14.2)	9/ 127	In-hospital	Mortality, disability
29	Alme KN, 2017[62]	Norway	Retrospective cohort study	Early-66	IS	66/ 2527	73.3 ± 15.8/ 70.8 ± 14.8	31/ 1068	7 days	Mortality, disability
30	Brondani R, 2017[12]	Brazil	Retrospective cohort study	Early-13, Late-9	IS	22/ 14	57.73 ± 10.32/ 60.86 ± 14.26	11/ 8	1086 (1172) days	Mortality
31	Chen Z, 2017[31]	Australia	Retrospective cohort study	Early-5, Late-17	IS	22/ 326	74 (59–79)/ 73 (63–80)	8/ 182	559 (IQR 107.5–1188.5) days	Mortality
32	Claessens D, 2017[16]	Netherlands	Retrospective cohort study	Early-32, Late-74	HS (ICH)	106/ 641	66.7 (62.8-70.6)/ 72.7 (71.7–73.7)	60/ 339	4.8 (IQR 0-12.6) years	Mortality
33	Huttunen J, 2017[21]	Finland	Retrospective cohort study	Late-121	HS (SAH)	121/ 658	47/ 50	58/ 273	12 years (median)	Mortality
34	Leung T, 2017[52]	Hong Kong	Retrospective cohort study	Early-104, Late-119	IS	223/ 2465	65 years (56–101)/ 62 years (32–100)	97/ 1454	6.17 years (mean)	Mortality, poor outcome
35	Xu Y, 2017[54]	Multicentric	Prospective cohort study	Early-42	IS	42/ 3097	66 ± 15/ 67 ± 13	32/ 1928	3 months	Mortality, poor outcome
36	De Marchis GM, 2016[34]	USA	Retrospective cohort study	NA	HS (SAH)	50/ 352	66 (56–74)/ 57 (46–66)	8/ 112	3 months	Mortality, poor outcome

37	Hamidou B, 2016[32]	France	Retrospective cohort study	Early-134	IS + HS	134/ 4224	NA/ NA	58/ 1969	1 year	Mortality
38	Zelano J, 2016[33]	Sweden	Retrospective cohort study	Late-7740	IS + HS	7740/ 98715	NA/ NA	NA/ NA	5 years	Mortality
39	Arntz RM, 2015[28]	Netherlands	Prospective cohort study	Early-21, Late-55	IS + TIA	76/ 555	40.4 ± 7.3/ 40.8 ± 7.8	39/ 255	12.5 (8.6) years	Mortality
40	Guekht A, 2015[66]	Russia	Prospective cohort study	Early-27, Late-3	IS + HS	30/ 70	65.9 ± 10.6/ 67.8 ± 10.9	16/ 36	23 (range 2–56) days	Mortality
41	Li Z, 2015[53]	China	Prospective cohort study	NA	HS (ICH)	139/ 3077	62 (52-73)/ 62 (53-72)	82/ 1893	1 year	Mortality, poor outcome
42	Zelano J, 2015[37]	Sweden	Retrospective cohort study	Late-36	IS + HS (ICH)	36/ 55	70.7 ± 10.39/ 69.3 ± 11.71	22/ 39	3 years	Mortality, poor outcome, disability
43	Aiwansoba IF, 2014[36]	Nigeria	Prospective cohort study	Early-25	IS + HS	25/ 226	62.68 ± 15.70/ 59.67 ± 13.04	19/ 113	42 days	Mortality
44	Belcastro V, 2014[67]	Italy	Prospective cohort study	Early-20, Late-12	IS	32/ 857	66.5 (61.0–78)/ 65.0 (58.0–77.0)	16/ 550	22.5 (2-43) months	Poor outcome
45	Huang CW, 2014[41]	Canada	Retrospective cohort study	Early-157	IS	157/ 10104	68.9 ± 1.4/ 72.2 ± 0.1	67/ 5253	1 year	Mortality, disability
46	Madzar D, 2014[68]	Germany	Retrospective cohort study	Early-18, Late-22	HS (ICH)	40/ 163	67.6 ± 9.4/ 66.2 ± 11.3	27/ 89	1 year	Poor outcome
47	Arntz RM, 2013[76]	Netherlands	Retrospective cohort study	Early-13, Late-41	IS + TIA + HS	54/ 483	38.1 ± 7.3/ 40.2 ± 8.0	28/ 213	9.8 (8.4) years	Poor outcome
48	Mullen MT, 2013[14]	USA	Retrospective cohort study	NA	HS (ICH)	1430/ 11603	64 (mean)/ 70 (mean)	747/ 5709	In-hospital	Mortality
49	De Reuck JL, 2012[70]	Belgium	Retrospective cohort study	Early-3, Late-21	IS	24/ 156	71.0 ± 10.8/ 65.4 ± 15.8	16/ 94	4.5 (2-7) years	Poor outcome

50	Jung S, 2012[27]	Switzerland	Retrospective cohort study	Early-26, Late-18	IS	44/ 761	59.1 ± 15.73/ 63.6 ± 13.6	24/ 426	3 months	Mortality, poor outcome
51	Procaccianti G, 2012[45]	Italy	Prospective cohort study	Early-66	IS + HS (ICH)	66/ 1987	81 (73–88)/ 82 (73–88)	37/ 999	1 month	Mortality
52	Couillard P, 2012[51]	Canada	Retrospective cohort study	Early-10, Late-6	IS	16/ 384	72.5 (29–94)/ 74.0 (24–101)	11/ 188	In-hospital	Mortality
53	Beghi E, 2011[43]	Italy	Prospective cohort study	Early-45	IS + HS	45/ 669	NA/ NA	24/ 375	1 month	Mortality, poor outcome
54	De Herdt V, 2011[13]	France	Prospective cohort study	Early-71	HS (ICH)	71/ 451	NA/ NA	41/ 233	6 months	Mortality
55	Burneo JG, 2010[44]	Canada	Retrospective cohort study	NA	IS + HS	138/ 4889	68.6 ± 1.4/ 71.5 ± 0.2	78/ 2555	1 year	Mortality, poor outcome, disability
56	Panitchote A, 2010[64]	Thailand	Retrospective cohort study	Early-35, Late-17	IS + HS	58/ 314	55.13 (mean)/ 57.9 (mean)	34/ 87	1 year	Mortality
57	Selim HA, 2009[75]	Egypt	Prospective cohort study	Early- 8	IS + HS	8/ 58	63 (mean)	NA/ NA	18 months	Dementia
58	Ahangar AA, 2008[22]	Iran	Retrospective cohort study	Early-15, Late-27	IS + HS	42/ 201	NA/ NA	25/ NA	2 years	Mortality
59	Lin YJ, 2008[10]	Taiwan	Retrospective cohort study	Early-13, Late-8	HS (SAH)	21/ 116	54.2 ± 14.7/ 56.6 ± 14.1	9/ 35	1 year	Mortality
60	Szaflarski JP, 2008[55]	USA	Retrospective cohort study	Early-190	IS + TIA + HS	190/ 5854	68 ± 15/ 71.7 ± 13.2	77/ 2556	1 month	Mortality
61	Bateman BT, 2007[48]	USA	Retrospective cohort study	NA	IS + HS	1681/ 819613	NA/ NA	739/ 367759	In-hospital	Mortality
62	De Reuck J, 2006[73]	Belgium	Retrospective cohort study	Late-125	IS	125/ 125	69.4 ± 14.6/ 72.3 ± 9.7	69/ 69	38 (range 4–102) months	Disability
63	Knake S, 2006[25]	Germany	Retrospective cohort study	NA	IS + HS	93/ 73	71 (21–90)/ 75 (44–96)	42/ 33	3 years	Mortality
64	Lossius MI, 2005[56]	Norway	Prospective cohort study	Late-15	IS	15/ 469	74.3 ± 6/ 76.3 ± 7	9/ 242	32(14-96) months	Mortality

65	Devuyst G, 2003[15]	Switzerland	Case-control	Early-37	IS + HS	37/ 74	NA/ NA	NA/ NA	In-hospital	Mortality
66	Labovitz DL, 2001[60]	USA	Retrospective cohort study	Early-37	IS + HS	37/ 867	68.3 ± 17.2/ NA	15/ 379	1 month	Mortality
67	Bladin CF, 2000[50]	Multicentric (Canada, Australia, Israel, Italy)	Prospective cohort study	Early-99, Late-69	IS + HS	168/ 1729	71.7 ± 13.6/ 72.8 ± 11.9	100/ 993	1 year	Mortality, disability
68	Arboix A, 1997[58]	Spain	Retrospective cohort study	Early-29	IS + HS	29/ 1191	67.6 ± 18.5/ 71.3 ± 13	20/ 615	In-hospital	Mortality
69	So EL, 1996[78]	USA	Retrospective cohort study	Early-33	IS	33/ 502	72.4 ± 10.2/ 71.5 ± 12.1	21/ 259	5.5 ± 7.1 years	Recurrent stroke
70	Shinton RA, 1988[42]	UK	Prospective cohort study	Early-13	IS + HS (ICH + SAH)	13/ 217	NA/ NA	NA/ NA	27 months	Mortality
71	Davalos A, 1988[57]	Italy	Prospective cohort study	Early-23	IS + HS	23/ 389	64.8 ± 15/ 65.1 ± 11	NA/ NA	In-hospital	Mortality

Abbreviations: PSS- Post-stroke seizures; IS- Ischemic stroke; HS- Hemorrhagic stroke; ICH- Intracerebral hemorrhage; SAH- Subarachnoid hemorrhage; USA- United States of America; UK- United Kingdom; IQR- Interquartile range; NA- Not available.

eTable 3: Risk factors associated with PSS

	OR (95% CI)	**p-value**
Hypertension	0.88 (0.78 to 1.00)	0.05
Diabetes Mellitus	0.98 (0.87 to 1.10)	0.72
Hyperlipidemia	**0.81 (0.69 to 0.94)**	**0.006**
Prior CVD	**1.28 (1.01 to 1.63)**	**0.04**
Ischemic Heart Disease	**1.28 (1.06 to 1.55)**	**0.01**
Atrial Fibrillation	**1.24 (1.07 to 1.44)**	**0.007**
Smoking	0.92 (0.77 to 1.09)	0.30
Alcohol	1.38 (0.79 to 2.40)	0.24
Thrombolysis	0.87 (0.62 to 1.23)	0.40
Hemorrhagic Transformation	**2.17 (1.55 to 3.04)**	**0.0003**

Abbreviations: PSS- Post Stroke Seizures; OR- Odds Ratio; CI- Confidence Interval; CVD- Cerebrovascular Disease.

eTable 4: Risk of bias (quality) assessment for the studies included in the systematic review and meta-analysis

S. No	Author, Year	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Risk of bias
1	Mohamed AT, 2023	Low	High	High	High	High	Low	Low	High	Low	Low	High	**High**
2	Alsaad F, 2022	Low	Moderate	High	Low	Low	Low	Low	High	High	High	Moderate	**High**
3	Chou CC, 2022	Low	Low	High	Low	Low	Low	Low	Low	Low	Low	Low	**Low**
4	Do PT, 2022	Low	High	High	Low	Low	Low	Low	Low	Low	Low	Low	**Moderate**
5	Franco AC, 2022	Low	Low	Low	High	High	Low	Moderate	Low	High	High	High	**High**
6	Lekoubou A, 2022	Low	Moderate	High	Low	Low	Low	Moderate	Low	Low	Low	Low	**Moderate**
7	Tanaka T, 2022	Low	Low	Low	Low	Low	Low	Low	Low	High	High	Low	**Moderate**
8	Alemany M, 2021	Low	Low	Low	Low	Moderate	Low	Moderate	Low	Low	Moderate	Low	**Low**
9	Ba K, 2021	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Low	**Low**
10	Lahti AM, 2021	Low	Low	Moderate	Low	Low	Low	Moderate	Low	Low	Low	Low	**Low**
11	Mansour S, 2021	Moderate	High	High	Low	Low	Low	Low	High	Low	Low	Low	**Moderate**
12	Mushannen T, 2021	Moderate	Moderate	High	High	High	Low	Low	High	Low	Low	High	**High**
13	Turaga S, 2021	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Low	**Low**
14	Zhang L, 2021	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Low	**Low**
15	Law ZK, 2020	Low	Low	Moderate	Low	Low	Low	Moderate	Moderate	Low	Moderate	Low	**Moderate**

16	Redfors P, 2020	Low	Low	Moderate	Low	Low	Low	Low	Low	High	High	Low	**Moderate**
17	Tabaeizadeh M, 2020	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Low	**Low**
18	van Tuijl JH, 2020	Low	Low	Moderate	High	High	Low	Low	Moderate	Moderate	Low	High	**Moderate**
19	Zollner JP, 2020	Low	High	High	Low	Low	Low	Low	High	Low	Low	Low	**Moderate**
20	Anadani M, 2019	Low	Low	Low	Low	Low	Low	Low	Moderate	Low	Low	Low	**Low**
21	Brondani R, 2019	Moderate	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	**Low**
22	Harnod T, 2019	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low	Low	**Low**
23	Liao HC, 2019	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Moderate	**Low**
24	Merlino G, 2019	Low	Low	Moderate	Low	Low	Low	Low	Low	High	High	Low	**Moderate**
25	Scoppettuolo P, 2019	Moderate	Moderate	Low	High	High	Low	Low	Moderate	Low	Low	High	**Moderate**
26	Matsubara S, 2018	Low	Low	Low	Low	Low	Low	Moderate	High	Low	Low	Low	**Low**
27	Shehta N, 2018	Low	Low	Moderate	Low	Low	Low	Low	High	Low	Low	Low	**Low**
28	van Tuijl JH, 2018	Low	Low	Moderate	Low	Low	Low	Low	Low	Low	Low	Low	**Low**
29	Alme KN, 2017	Low	Low	Moderate	Low	Low	Low	Low	High	Low	Low	Low	**Low**
30	Brondani R, 2017	Moderate	Low	Low	High	High	Low	Moderate	Low	Low	Low	High	**Moderate**
31	Chen Z, 2017	Low	Low	Low	Low	Moderate	Low	Moderate	Low	Low	High	Moderate	**Moderate**
32	Claessens D, 2017	Low	Low	Moderate	Low	Low	Low	Low	Low	Low	Moderate	Low	**Low**

33	Huttunen J, 2017	Low	Low	Moderate	Low	Low	Low	Low	Low	Low	Low	Low	**Low**
34	Leung T, 2017	Low	Low	Low	Low	Low	Low	Low	Low	High	High	Moderate	**Moderate**
35	Xu Y, 2017	Low	Low	Moderate	Low	Low	Low	Low	Moderate	Low	Low	Low	**Low**
36	De Marchis GM, 2016	Low	Low	Low	Low	Low	Low	Low	Moderate	High	High	Low	**Moderate**
37	Hamidou B, 2016	Low	Low	Moderate	Low	Low	Low	Low	Low	Low	Low	Low	**Low**
38	Zelano J, 2016	Moderate	Low	Low	Low	Low	Low	Moderate	Low	High	High	Low	**Moderate**
39	Arntz RM, 2015	Low	Low	Low	Low	Low	Low	Moderate	Low	Low	Low	Low	**Low**
40	Guekht A, 2015	Low	Low	Moderate	Low	Moderate	Low	Moderate	Moderate	Low	Low	Moderate	**Moderate**
41	Li Z, 2015	Low	Moderate	Moderate	Low	Low	Low	Low	Low	High	High	Low	**Moderate**
42	Zelano J, 2015	Moderate	Low	Moderate	High	High	Low	Low	Low	Low	Low	High	**Moderate**
43	Aiwansoba IF, 2014	Low	Moderate	High	Low	Moderate	Low	High	Moderate	Low	Low	Moderate	**Moderate**
44	Belcastro V, 2014	Low	Low	Low	Low	Low	Low	Low	Moderate	Low	Low	Low	**Low**
45	Huang CW, 2014	Low	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low	Moderate	**Low**
46	Madzar D, 2014	Low	Low	Low	Low	Low	Low	Low	Low	High	High	Low	**Moderate**
47	Arntz RM, 2013	Low	Low	Moderate	Low	Low	Low	Low	Low	Low	Low	Low	**Low**
48	Mullen MT, 2013	Moderate	High	High	Low	Low	Low	Low	High	Low	Low	Low	**Moderate**
49	De Reuck JL, 2012	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Moderate	**Low**

50	Jung S, 2012	Low	Moderate	High	Low	Low	Low	Low	Moderate	High	High	Low	**Moderate**
51	Procaccianti G, 2012	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Moderate	**Low**
52	Couillard P, 2012	Moderate	Low	Low	High	High	Low	Low	High	Low	Low	High	**Moderate**
53	Beghi E, 2011	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Low	**Low**
54	De Herdt V, 2011	Low	Low	Low	Low	Low	Low	Low	Moderate	High	High	Low	**Moderate**
55	Burneo JG, 2010	Moderate	Low	Moderate	Low	Low	Low	Low	Low	Low	Low	Moderate	**Low**
56	Panitchote A, 2010	Low	High	High	High	High	Low	Low	Low	Moderate	High	High	**High**
57	Selim HA, 2009	Low	Low	Moderate	Low	Moderate	Low	Low	Low	High	High	Moderate	**Moderate**
58	Ahangar AA, 2008	Low	Low	Moderate	High	High	Low	Low	Low	Low	Low	High	**Moderate**
59	Lin YJ, 2008	Low	Low	Moderate	High	High	Low	Low	Low	Low	Low	Moderate	**Moderate**
60	Szaflarski JP, 2008	Low	Moderate	Moderate	Low	Low	Low	Low	Moderate	Low	Low	Moderate	**Moderate**
61	Bateman BT, 2007	Low	Moderate	High	Low	Low	Low	Moderate	High	Low	Low	Low	**Moderate**
62	De Reuck J, 2006	Low	Low	Low	High	High	Low	Low	Low	Low	Low	High	**Moderate**
63	Knake S, 2006	Low	Moderate	Moderate	Low	Low	Low	Moderate	Low	High	Moderate	Low	**Moderate**
64	Lossius MI, 2005	Low	Low	Moderate	Low	Low	Low	Low	Low	Low	Low	Low	**Low**
65	Devuyst G, 2003	Moderate	Low	Moderate	Low	Low	Low	Moderate	High	Low	Low	Moderate	**Moderate**
66	Labovitz DL, 2001	Low	Low	Moderate	Low	Low	Low	Moderate	Moderate	Low	Low	Low	**Low**
67	Bladin CF, 2000	Low	Low	Moderate	Low	Low	Low	Low	Low	High	High	Low	**Moderate**

68	Arboix A, 1997	Low	Low	Low	Low	Low	Low	Moderate	High	Low	Low	Low	**Low**
69	So EL, 1996	Moderate	Low	Low	Low	Low	Low	Low	Low	Low	High	Low	**Low**
70	Shinton RA, 1988	Moderate	Low	Moderate	High	High	Low	Moderate	Low	Low	Low	High	**Moderate**
71	Davalos A, 1988	Low	High	High	Low	Low	Low	Low	High	Low	Low	High	**Moderate**

Key: Item 1- two groups similar and recruited from the same population; Item 2- exposures measured similarly to assign people to both exposed and unexposed groups; Item 3- exposure measured in a valid and reliable way; Item 4- confounding factors identified; Item 5- strategies to deal with confounding factors stated; Item 6- groups/participants free of the outcome at the start of the study; Item 7- outcomes measured in a valid and reliable way; Item 8- follow up time reported and sufficient to be long enough for outcomes to occur; Item 9- follow up complete, and if not, were the reasons to loss to follow up described and explored; Item 10- strategies to address incomplete follow up utilized; Item 11- appropriate statistical analysis used.

eTable 5: Association of disability (mean mRS score) with post-stroke seizures

S. No	Outcome measures	Cases	Controls	No. of studies	SMD (95% CI)	I^2
Main analysis						
1	**Primary analysis**					
	PSS vs. no PSS	1001	21850	10	**0.57 (0.43 to 0.72)**	71%
2	**Limit analysis by adjusting for small study effect**					
	PSS vs. no PSS (adjusted odds)	1001	21850	10	**0.49 (0.24 to 0.74)**	71%
Subgroup analyses						
3	**Seizure types**					
	Early PSS vs. no PSS	268	13595	3	**0.75 (0.13 to 1.37)**	82%
	Late PSS vs. no PSS	341	1363	3	**0.56 (0.02 to 1.10)**	56%
4	**Risk of bias**					
	Low (PSS vs. no PSS)	447	17794	5	**0.57 (0.21 to 0.92)**	76%
	Moderate (PSS vs. no PSS)	509	3092	4	**0.47 (0.20 to 0.74)**	50%
	High (PSS vs. no PSS)	45	964	1	**0.57 (0.40 to 0.75)**	-
5	**Stroke subtypes**					
	PISS vs. no PSS	599	15278	6	**0.59 (0.38 to 0.80)**	75%
	PHSS vs. no PHSS	48	445	2	0.12 (-0.82 to 1.06)	90%

Bold values: $p<0.05$.

No ICD code-based studies were eligible for this analysis.

Abbreviations: SMD- Standardized Mean Difference; CI- Confidence Interval; PSS- Post Stroke Seizures; PISS- Post Ischemic Stroke Seizures; PHSS- Post Hemorrhagic Stroke Seizures.

eTable 6: Association of recurrent stroke and dementia with post-stroke seizures

S. No	Outcome measures	Cases	Controls	No. of studies	OR (95% CI)	I^2
Recurrent Stroke						
Main analysis						
1	**Primary analysis**					
	PSS vs. no PSS	172/ 636	1429/ 8274	5	1.32 (0.59 to 2.96)	82%
Subgroup analysis						
2	**ICD codes**					
	No ICD codes	20/ 150	193/ 1182	3	0.82 (0.06 to 12.04)	82%
	ICD codes	152/ 486	1236/ 7092	2	2.21 (0.65 to 7.54)	0%
Dementia						
Main analysis						
1	**Primary analysis**					
	PSS vs. no PSS	50/ 1582	279/ 22164	2	**3.11 (1.25 to 7.72)**	43%
Subgroup analysis						
2	**ICD codes**					
	No ICD codes	5/ 8	11/ 58	1	**7.12 (1.47 to 34.39)**	-
	ICD codes	45/ 1574	268/ 22106	1	**2.40 (1.74 to 3.30)**	-

Bold values: $p<0.05$.

Abbreviations: OR- Odds Ratio; CI- Confidence Interval; PSS- Post Stroke Seizures; ICD- International Classification of Disease.

eTable 7: A comparison of our meta-analysis with previously published meta-analyses on the association of post-stroke seizures with mortality

Meta-analysis	**Ren *et al.* (2022)[1]**	**Lin *et al.* (2022)[2]**	**Misra *et al.* (Present study)**	
No. of studies	10	13	71	
Outcomes assessed (N= studies)	Mortality (N=10)	Mortality (N=11)	Mortality (N=57), poor functional outcome (N=22), disability (N-=10), recurrent stroke, (N=5), dementia (N=2)	
Seizure types included	Late-onset seizures	Early and late-onset seizures	Early and late-onset seizures	
Stroke subtypes included	Ischemic and hemorrhagic stroke	Hemorrhagic stroke	Ischemic and hemorrhagic stroke	
Pooled analysis	Pooled adjusted estimates	Pooled crude and adjusted estimates	Pooled raw data	
Association with Mortality	Late seizures associated with mortality.	No association of seizures post hemorrhagic stroke with mortality.	PSS associated with mortality. In subgroup, early but not late seizures were associated with mortality.	Seizures after both stroke subtypes (ischemic and hemorrhagic) are associated with mortality.

eTable 8: Future directions for PSS studies

S. No	Challenges in PSS research	Future directions
1.	Disparate definitions for early- and late-onset seizures post-stroke.	Use ILAE's updated definition for post-stroke epilepsy and seizure classification.
2.	Lack of segregated outcome data on seizure subtypes and stroke subtypes.	Early and late seizures, and ischemic and hemorrhagic stroke are very different phenomena and must be reported separately in future studies.
3.	Variable length of follow-up from hospital discharge to 26 years.	We propose at least 2 years, preferably 3 years, post-stroke follow-up in PSS research.
4.	Lack of data on epilepsy and cognitive outcome measures.	Report clinical, functional, patient-reported outcomes, cognitive, and epilepsy outcomes (e.g., seizure frequency, seizure control, seizure severity).
5.	Inconsistent reporting of NIH stroke scale.	Consistently report the age, stroke severity, and time of outcome assessment.
6.	Lack of reporting standards in observational studies.	Report their results in accordance with Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.
7.	PSS research based on ICD codes is prone to misclassification.	Institution-level regular audit of the ICD coding to ensure credibility of the ICD code-based research.
8.	Use of disparate methodology and lack of adequately powered prospective studies.	Collaborative efforts like prospective multicentric studies and individual patient data analyses to further PSS research; use predefined common data elements and patient outcomes.

eReferences

1. Ren Z, Wen Q, Yan X, Wang Y, Zhang Y. Post-stroke epilepsy and risk of all-cause mortality: A systematic review and meta-analysis of cohort studies. *Clin Neurol Neurosurg*. 2022;220:107362. doi: 10.1016/j.clineuro.2022.107362
2. Lin HY, Wei QQ, Huang JY, Pan XH, Liang NC, Huang CX, Long T, Gao W, Shi SL. Relationship Between Mortality and Seizures After Intracerebral Hemorrhage: A Systematic Review and Meta-Analysis. *Front Neurol*. 2022;13:922677. doi: 10.3389/fneur.2022.922677