

Table S1 Table of study characteristics

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
Alteri et al, 2004, Italy (S27)	1995-97	N=191 L	Y	Severe aphasia or neglect, <5 years' education, SAH, age <40 years, concomitant neurological disorder, severe comorbidity	71	30	89	Y	N	Annually for 4 years	ICD-10
Caratozzolo et al, 2016, Italy (S10)	2011	N=105 P	Y *	TIA	72.4 (10.7)	37.1	85	Y	Y IQ-CODE	12 months	Itel-MMSE (< 24) DSM-IV
Delgado et al, 2010, Chile (S13)	2005-2006	N=74 P	Y *	Poor consciousness, TIA,SAH, CNS Disorders, Severely impaired stroke (mRS >3)	72.2 (7.7)	42.0	89.0	Y	Y SS-IQCODE	12 months	Neuropsychologic al evaluation including MMSE & Mattis Dementia Rating Scale
de Koning et al, 1998, 2000 Netherlands (S30, S31)	1993-96	N=300 X	N	Aphasia, sensory impairment, not fluent in Dutch,	70	40.0	71	N	NA	3-9months	DSM IIIR

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
				reduced consciousness							
de Koning et al, 2005 Netherlands (S31)	2000-01	N=121 X	N	Aphasia, sensory impairment, not fluent in Dutch, reduced consciousness	70	38	63	N	Y (FU only) Interview	3-9months	DSM IIIR
Gur et al, 1994, Israel (S33)	1988-90	N=199 L	Y	Aphasia	73	53	100	Y	N	6 monthly to 5 years	DSM IIIR
Henon et al, 2002 France (S34)	1995-1996	N=142 L		Non-white, no informant, age <40 years, not fluent in French, not from Lille, history of severe head trauma	72	46	Not reported	N	Y IQCODE	6 months, annually to 3 years	ICD-10
Inzitari et al 1998, Italy (S35)	1993-94	N=339 X	N	None given	71	48	83.2	Y	Y (FU only) Interview	1 year	ICD-10

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
Ihle-Hansen et al, 2010, Norway (S14)	2007-2008	N=184 P	Y	SAH, TIA, MCI, Life expectancy < 1 year	72 (12.2)	49.5	76.4	Y	Y IQCODE	12 months	MMSE & CDT + TMT-A + TMT-B ICD-10
Kumutpong anich et al, 2017 Thailand (S5)	2006-2007	N=85 X	Y *	Dementia before stroke, Expired or lost to follow up, Unable to perform neuropsychological test, Imaging study was not performed or was lost, Patients with aphasia	69.4 (9.3)	N/A	100	Y	Y	12 months	TMSE, Category Verbal Fluency Test, Neuropsychiatric Inventory DSM-IV, NINDS- AIREN
Mehrabian et al, 2015 Bulgaria (S17)	N/A	N=74 P	Y	ICH, NIHSS >6, Persistent aphasia, Severe sensory impairment, Malignant disease, Neurological conditions, Psychiatric conditions, History of Pre-Stroke Cognitive Impairment	65.6 (5.6)	21.2	100	Y	N	12 months	MMSE & Neuropsychologic al battery DSM-IV, NINDS- AIREN

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
Renjen et al, 2015 India (S20)	N/A	N=50 P	Y *	TIA, Neurodegenerative disorder, Moderate to severe aphasia	61.8	36	74	Y	Y Short-IQCODE	12 months	PGI-Battery of Brain Dysfunction (PGI BBD > 30) & IQCODE DSM V
Sarfo et al, 2017, Ghana (S21)	2015-2016	N=58 X	N	On sedatives, Aphasia without proxy, Significant physical illness, Motor/Sensory impairment (hearing visual), Neurological or psychiatric illness Systemic disorders capable of impairing cognition	59.9 (13.7)	47.6	66	N	NA	3 months, 12 months, 2-4 years and 5 years	MoCA & V-NB DSM IV
Selim et al, 2009 Egypt (S22)	2007-2008	N=66 P	Y *	TIA, SAH, CVT, Seizure history, Severe head trauma history, Neurological surgery	Median age 63	47.0	74.2	Y	Y IQCODE	18 months	MMSE + Neuro- psychological battery ICD-10

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
Surawan et al, 2018 Thailand (S4)	2017	N=138 P	Y *	Depression, Vitamin B12 deficiency, renal failure, hypothyroid, syphilis, HIV, Pick's disease, CJD, Huntington's disease, Parkinson's, Alzheimer's Disease, Sensory impairment (hearing/ visual), Communication impairment	Mean 69	46.1	100	Y	N	3 and 6 months	MMSE-Thai 2002 (≤ 23) Modified DSM V
Yang et al, 2015 Hong Kong (S25)	2009-2010	N=1013 P, X	Y *	Severe language impairment, Terminal illness, Psychiatric comorbidity	69.2 (11.7)	44.3	70.1	Y	Y Not reported	6 months	Cantonese MMSE + MoCA (HK Version) DSM IV & CDR
Akinyemi et al, 2014 Nigeria (S8)	2010-12	N=143 P	N	SAH, Moderate to severe aphasia, Significant physical and sensory impairment, Psychiatric history	60.4 (9.5)	43.4	79.5	N	Y CSID- informant part	3 months	CSID + MMSE + V- NB

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
											DSM-IV+ AHA/ASA VCI criteria
Arauz et al, 2014 Mexico (S9)	2005	N=110 P, X	Y	TIA, SAH, Severe aphasia	56 (17.8)	38.2	84.0	Y	Y IQ-CODE	3 months	CASI CDR + DSM-IV / NINDS-AIREN
Assayag et al, 2017 Israel (S26)	2008-14	N=507 L	Y	Head trauma or brain procedures, ICH, Severe aphasia	67.4 (9.7)	40.6	100	Y	N IQ-CODE	24 months	MoCA & NeuroTrax computerised Cognitive Testing DSM-IV
Barba et al , 2000 Spain, (S28)	1994-95	N=251 X, L	N	Primary brain lesion, aphasia, comorbidity	69	47	88.4	N	Y IQ-CODE	3,6,24 months	DSM IIIR
Censori et al, 2000 Italy, (S29)	1993-94	110 X	Y	Age <40 or ≥80 years, other neurological disorder, unusual cause of stroke, comorbidity, depression,	65	35	100	Y	N	3 months	NINDS A

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
				sensory impairment							
Desmond et, 1996 al USA, (S32)	1988–90 1994–97	N=453 X, L	N	Dysphasia, unable to speak English or Spanish, low GCS, age <60 years	70	53	100	N N (Y in L study)	N	3 months, annually up to 4 years	DSM III
Gorelick et al, 1993 USA, (S44)	1987–90	N=147 X	N	Aphasia, Parkinson's disease, possible prior Alzheimer's disease	72	49	100 (Multiple IS)	N	N	2-3months	DSM III
Khedr et al, 2009 Egypt, (S16)	N/A (1 year duration)	N=81 p	Y	Poor consciousness, Persistent Aphasia, Psychosis, SAH, Systemic Disease, cancer, Severe head trauma history, Neurological surgery, Severe sensory impairment	57.7 (5.19)	33.3	84	Y	Y IQCODE	3 months	MMSE <21 / CASI <67 DSM-IV
Klimkowicz et al, 2002 Poland, (S37)	2000–01	N=220 X	N	Age ≤40 years, no reliable informant, other brain lesion	66	55	87.2	N	Y IQCODE	3 months	DSM IV

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
Tang et al, 2004, China (S40)	Data not available	N=280 X		Non-Chinese ethnic group, non- Cantonese speaking, age <50 years	71	55	Not reported	N	Y (FU only) (IQCODE)	3 months	DSM IV
Tang et al, 2017 Taiwan (S23)	2014-15	N=172 X	N	Active infection, cancer, renal disease, autoimmune disorder, Current steroid treatment, Poor diabetes control	72.1 (7.5)	35.5	100	N	NA	85±54.0 months	MMSE & MoCA NINDS-AIREN, CDR
Ojagbemi et al, 2017 Nigeria (S18)	2014-16	N=96 P	N	Unable to communicate reliably, Aphasia, Severe-co- morbidities	61.1 (12.9)	46.5	N/A	N	Y IQ-CODE	3 months	MMSE NINDS-AIREN
Pohjasvaara et al Finland, 1997 (S38)	1993–95	N=451 X	N	Age <55 or >85 years, unable to speak Finnish,	71	49	100	N	Y (FU only) Interview	3 months	DSM III

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
				non-resident in Helsinki, reduced conscious level, poor hearing, aphasia							
Yu et al, 2013, South Korea (S7)	2007-08	N=328 P	Y *	Severe medical or neurological condition, Severe aphasia, death within 2 weeks of stroke onset	63.9 (12.4)	38.8	100	N	Y IQCODE	3 months	K-VCIH-S-NP protocol + Korean MMSE DSM-IV
Zhou et al, 2004, China (S41)	1999-00	N=434 X	N	Concomitant neurological disorder, age <55 years, severe medical comorbidity or sensory impairment, reduced GCS, severe aphasia	68	47	100	N	Y (FU only) IQCODE	3 months	DSM IV
Appelros et al 2002 Sweden (S45)	1999-00	N=232 P, X	Y	Aphasia	74	50	73.0	N	Y Interview	1 year	MMSE

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
Corraini et al, 2017 Norway (S12)	1982-13	N=215,118 R	Y	Previous stroke, mild cognitive impairment, amnesic syndrome	Median age 72	47.6	39.2	Y	Y	30 years	ICD-10
Das et al, 2013 India (S3)	2006-10	N=219 P	Y *	TIA, Aphasia, Psychosis, Sensory impairment (hearing/visual)	74.5 (8.30)	48	N/A	N	NA	36 months	BMSE (adaptation of MMSE) + Kolkata Cognitive Screening Battery CDR + DSM III-R
Kokmen et al 1996, USA (S42)	1960-84	N=971 R	Y	Previous stroke or dementia	Not available	50	100	NA	Records	Up to 25 years	NA
Pendlebury et al, 2019, UK (S6)	2002-12	N=2080 P, L	N	Previous diagnosis of dementia	74.4 (13.0)	51	64.3	Y	Y MMSE / MoCA / Telephone Interview for Cognitive Status - Modified	60 months (median 4.2 years)	MMSE (< 24) & MoCA MoCA (Telephone Version) Telephone Interview for Cognitive Status - Modified

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
											DSM-IV
Srikanth et al, 2004, Australia (S39)	1998-99	N=198X, L, PPS	Y	Aphasia, unable to speak English, inadequate vision or hearing	69	41	93.2	N	NA	3 months; 1, 2 years	DSM-IV
Qu et al, 2015, China (S1)	2012-13	N=599 X	N	TIA, Existing neurological or psychiatric disorders, Aphasia, Sensory impairment (hearing/ visual), Poor consciousness	67.9 (16.6)	54	86.5	Y	N	Not specified. Assumed 1 year.	MOCA + MMSE with stratification cut-off by education, Hachinski Ischaemic
Clark et al, 2018, USA (S11)	2000-10	N=68,758 R, L	N	Prior diagnosis of dementia	68 (13)	51	100	Y	N Exclusion criteria	60 months	ICD-9
Kase et al, 1998, USA (S36)	1982-01	N=74 L, V		Previous stroke or dementia	79	61	68.9	Y	Y	10 years	DSM III, MMSE DSM IV

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
Portegies et al, 2016 Netherlands (S19)	1990-12	N=993 P	Y	Prevalent stroke, Prevalent dementia	79.9 (8.7)	60.4	N/A	Y	Y MMSE	115 months (+/- 72 months)	3 step protocol : MMSE<26, Geriatric Metal Schedule (GMS)>0 and Cambridge Examination for Mental Disorders in the Elderly Neurologist-led clinical diagnosis/consens us meeting
Kim et al, 2017 South Korea (S15)	2002	N=2527 P	Y	Non-citizens (Korea), Stroke and dementia between year 2002 & 2003	72	54.8	N/A	Y	N	120 months	ICD-10
Tu et al, 2013 China (S24)	2008-11	N=689 X	N	ICH, Alcohol, Severe aphasia, Severe sensory impairment (hearing/ visual)	68.6 (11.4)	41.4	100	Y	N	3 months	MOCA-CS + MMSE + FAB-CS

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
											CDR + NINDS- AIREN
Zhang et al, 2017 Mongolia (S2)	N/A	N= 444 X	N	Neurological system disease that may affect cognition (AD), History of psychoactive drug abuse, CO /chemical poisoning, chronic alcoholism, Severe aphasia, Sensory impairment (hearing/ visual), History of mental disorder	spilt into different categories	43.9	87.4	Y	N	Not Specified. Assumed 3 months.	MoCA - Beijing Version HIS NINDS-AIREN
<p>Included in previous meta-analysis Y* = included in the pre-stroke dementia analysis only</p> <p>P - Prospective / R - Retrospective / X - Cross Sectional / L - Longitudinal (studies with multiple follow-ups beyond 12 months).</p> <p>FES – Studies recruiting (FES) First Ever Stroke Candidates: Y = Yes N = No (Mixed Population Data) Y * = Study recruiting mixed population but with FES and Recurrent Stroke Data available</p> <p>CVT – Cerebral Venous Thrombosis, ICH – Intra-Cerebral Haemorrhage, MCI – Mild cognitive Impairment, NIHSS – National Institutes of Health Stroke Scale, SAH – Subarachnoid Haemorrhage, TIA – Transient Ischaemic Attack AHA/ASA – American Heart Association/American Stroke Association; BMSE – Bengali Version of Hindi Mental State Examination</p> <p>CASI – Community Abilities Screening Instrument; CDR – Clinical Dementia Rating, CSID – Community Screening Instrument of Dementia; DSM – Diagnostics and Statistical Manual; FAB-CS – Frontal Assessment Battery-Chang Sha Version, ICD – International Statistical Classification of Diseases and Related Health Problems; HIS – Hachinski Ischaemic Score; IQCODE – Informant Questionnaire on The Cognitive Decline in Elderly; SS-IQCODE – Shortened Spanish IQCODE; K-VCIHS-NP – Korean-Vascular Cognitive Impairment Harmonisation Standards-Neuro-Psychological; MoCA-CS – Montreal Cognitive Assessment-Chang Sha Version; NINDS-AIREN - National Institute of Neurological Disorders and Stroke and Association Internationale; PGI-BBD – PGI-Battery of Brain Dysfunction pour la Recherche et l'Enseignement en Neurosciences. (Vascular Dementia Criteria); TMSE – Thai Mental State Examination</p> <p>TMT-A – Train Making Test – A; TMT-B – Train Making Test – B; 5WDFR – 5-Word Delay Free Recall; V-NB – Vascular Neuro-Psychological Battery</p> <p>*** PSD Data: MIXED : Pre-Stroke Dementia not evaluated/excluded. PSDanalysis includes possible pre-stroke dementia data. PSD : PSDData (Pre-Stroke Dementia Excluded)</p>											

Study, Year Country	Date of data Collection	No. of population Study Type	FES	Exclusion Criteria	Mean Age (SD)	Female (%)	Ischaemic Stroke (%)	Pre-stroke dementia excluded	Pre-stroke dementia quantified	Follow-up Duration	PSD Assessment Method
PSD Assessment Method - CD-S: Clinical Diagnosis using standard classification system; CD-Other: Clinical diagnosis using other assessment tool; NPB: Neuro-Psychological Battery											

Table S2 Results of Sensitivity Analysis

Outcome	No. of studies	Prevalence % (95% CI)	Prevalence % (95% CI), n= number of studies
Removal of outliers			
Prevalence any timeframe			
Including pre-stroke dementia	16	21.4(18.2-25.0)	22.3 (18.8 to 26.2), n=17,
Excluding pre-stroke dementia	26	15.6 (14.0-17.3)	16.5(10.4 to 25.1), n=33
Prevalence at 1 year			
Including pre-stroke dementia	6	20.4(14.2-28.2)	20.4 (14.2 to 28.2), n= 6
Excluding pre-stroke dementia	14	20.5(15.0-27.4)	18.4 (7.4 to 38.7), n=16
Removal of moderate quality studies			
Prevalence any timeframe			
Including pre-stroke dementia	14	21.3(17.2-26.2)	22.3 (18.8 to 26.2), n=17,
Excluding pre-stroke dementia	25	15.3(7.9-27.5)	16.5(10.4 to 25.1), n=33
Prevalence at 1 year			
Including pre-stroke dementia	4	17.4(9.2-30.4)	20.4 (14.2 to 28.2), n=6
Excluding pre-stroke dementia	14	17.2(6.7-37.3)	18.4 (7.4 to 38.7), n=16

Table S3 Overall strength of evidence

Prevalence of Post- Stroke Dementia						
Risk of Bias	Consistency	Directness	Precision	Publication Bias	Effect (95%CI)	Quality of Evidence
Possibly serious	Serious	Not serious	Serious	Possibly serious	22.3% 95%CI:18.8 to 26.2 16.5% 95%CI:10.4 to 25.1	Low