Association of sleep disturbances with the development of cognitive impairment. A Systematic Review

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The aim

The glymphatic system eliminates waste products from the brain such as beta-amyloid peptides and hyper-phosphorylated tau proteins (behind the development of dementia)

Sleep is essential for the restoring of a lot of physiologic functions, among them the activation of the Glymhatic System, that is reduced by 90% in the awake state

The aim of this systematic review was to evaluate the strength of association of sleep disturbances with the development of cognitive impairment or dementia (PROSPERO reference CRD42021276173).

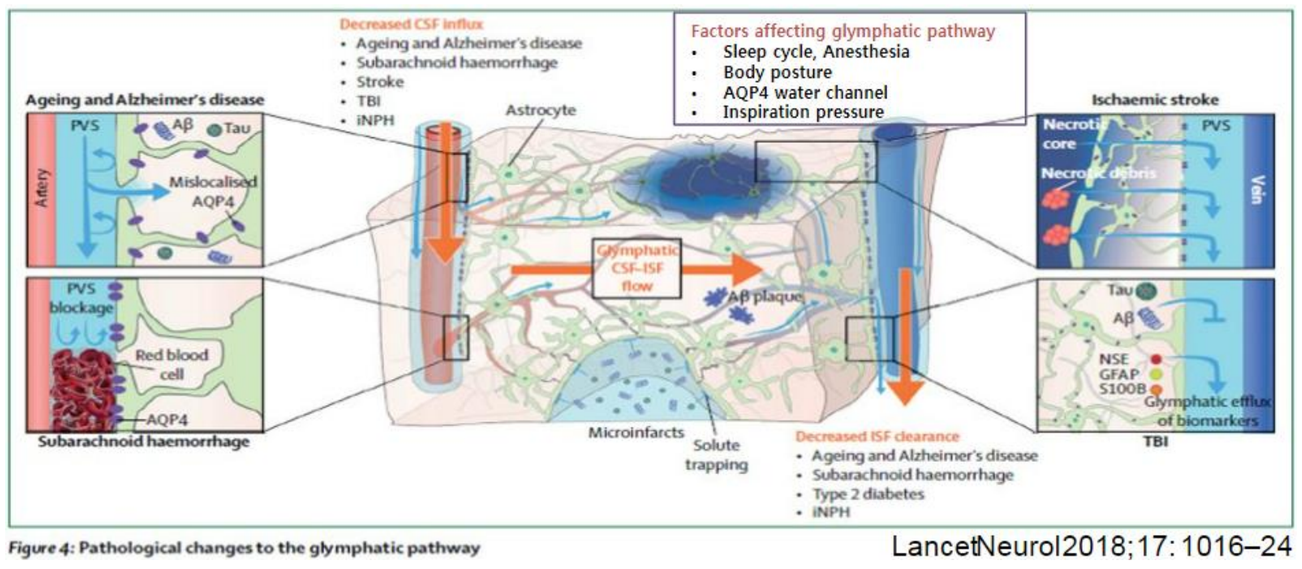

Figure 4: Pathological changes to the glymphatic pathway

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PICO

Participants

- Adults (≥ 18 years) without conditions known to be risk factor for further cognitive impairment

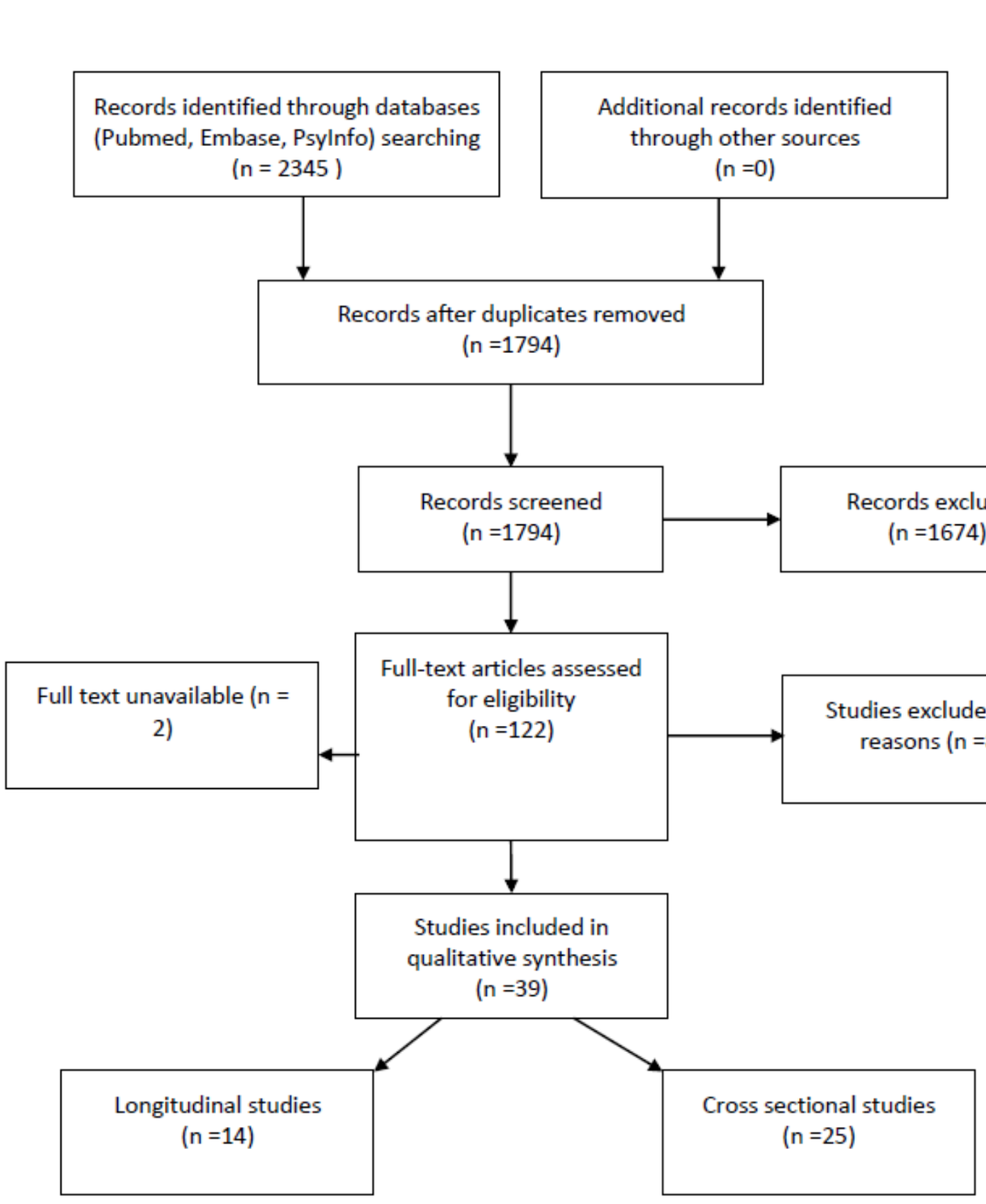
Exposure

- sleep disturbance (insomnia or other disturbance of the quality or quantity of sleep) caused by obstructive sleep apnoea, overweight or obesity, physical illnesses, reduced physical activity, frequent awakenings, overnight shifts, shift workers.

Outcomes

- mild cognitive impairment (MCI), severe cognitive impairment (e.g. Alzheimer's, age-related dementia, or other form of dementia) as measured by validated cognitive tests

Results



We included a total of fourteen longitudinal studies with 598.969 participants and twenty-five cross-sectional studies with a total of 15900 participants

Conclusions

The review demonstrated a strong association between sleep disturbances and cognitive impairment/dementia with an increased risk of up to 4.7 times. Particular attention should be paid to the precocity of cognitive impairment, found at a follow-up of 5-10 years after the diagnosis of OSA.

The evidence of an association between sleep disturbance or sleep apnoea and the subsequent development of cognitive impairment or dementia from longitudinal studies can be considered robust as 63% of the studies were of high quality and the remaining were of medium quality;

References:

Louveau A, et al. Structural and functional features of central nervous system lymphatic vessels. Nature. 2015;523(7560):337-41. doi: 10.1038/nature14432.

Jessen NA, et al. The Glymphatic System: A Beginner's Guide. Neurochem Res. 2015 Dec;40(12):2583-99. doi: 10.1007/s11064-015-1581-6.

Iliff JJ,et al. A paravascular pathway facilitates CSF flow through the brain parenchyma and the clearance of interstitial solutes, including amyloid β. Sci Transl Med. 2012;4(147):147ra111. doi: 10.1126/scitranslmed.3003748.

. Ju YE, et al. Obstructive sleep apnea decreases central nervous system-derived proteins in the cerebrospinal fluid. Ann Neurol. 2016;80(1):154-9. doi: 10.1002/ana.24672.