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Visual Search Post-Stroke: a Protocol for the Scoping Review of Associated Research Foci and Gaps

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ADMINISTRATIVE INFORMATION

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INTRODUCTION

Review question / Objective This scoping review will examine the focus, scope and context of the existing body of literature that investigates visual search capacity post-stroke.

The objectives of this study are to:

• Examine the demographic and clinical characteristics of participant populations in stroke-specific visual search studies, including age, visual impairment status, ethnicity, sex/gender, and type of stroke.

• Examine which measures are used to assess visual search capacity.

• Examine the various domains in which visual search is studied in relation to stroke including diagnosis of visual impairment, rehabilitation or anatomical mapping.

Background A stroke can be defined as a vascular injury caused by an obstructed blood supply or haemorrhage within the central nervous system that is associated with an acute functional neurological deficit (Murphy & Werring, 2020). Post-stroke impairments are diverse, with deficits potentially manifesting within cognitive function, motor control and sensory processing (Cramer et al., 2023; Gandhi et al., 2021; Raghavan, 2015). Visual impairment is prevalent post-stroke, with deficits identifiable in 60% of survivors (Rowe et al., 2019). Visual impairment can take various forms, indeed, in a cohort of 1033 stroke survivors, 56% exhibited reduced central visual acuity, 40% presented with ocular motility disorders, 28% demonstrated visual field loss, and 27% showed signs of visual inattention (Rowe et al., 2019). Visual impairment can impede a person's ability to perform visual search, the process of finding specific objects in an unknown position within the environment (Bouma, 2022). Many activities of daily living rely upon visual search, for example finding all the food on a plate or avoiding bumping into nearby objects (Ito et al., 2022). As such, impaired visual search may impact a person's ability to live independently and their quality of life (Ramzaoui et al., 2018; Smith et al., 2018; Ten Brink et al., 2016).

Rationale Impaired visual search post-stroke has the potential to impact activities of daily living and quality of life. Therefore, considerable research effort has been expended to develop the understanding of, and develop interventions to support, post-stroke visual search. However, stroke survivors are a diverse population in terms of demographic characteristics, pre-existing individual differences, and the presence of temporary or permanent post-stroke functional deficits (Gittins et al., 2021; Jacobs & Ellis, 2021; Wagner et al., 2024). The extent to which this diversity is represented within stroke-specific study populations is yet to be elucidated. Furthermore, little is known about the settings in which visual search is tested, and the extent to which potentially confounding variables (such as cognitive or motor impairment) are managed. A scoping review methodology was therefore adopted as it allows for the mapping of the evidence base related to visual search capacity post-ischemic stroke or Primary Intracerebral Haemorrhage, whilst enabling a broad range of articles to be included.

METHODS

Strategy of data synthesis After the search has been conducted in all specified databases, duplicate articles will be removed systematically. Two reviewers (FJP and SM) will use Rayyan QCRI ® software to independently screen the titles and abstracts of the retrieved articles in accordance with the inclusion and exclusion criteria. All studies that are considered eligible at this stage will undergo full-text screening conducted independently by these same two reviewers. Disagreement regarding inclusion at either screening stage will be resolved through discussion between the reviewers and the wider authorship team. Once all inclusion decisions have been made, a flow diagram will be produced that details all of the sources of evidence that underwent screening, and how many articles passed the screening of each stage.
The data extraction sheet will include variables relating to: study identification, study characteristics, sample characteristics, study focus, methods, research gaps and future directions. The data extraction sheet will be designed in accordance with best practice guidelines (Peters et al., 2022; Pollock et al., 2023) and piloted before use by two independent reviewers on ten papers each. Revisions to this data extraction sheet based in this pilot phase will be iterative. The data extraction will initially be conducted by a single reviewer, then the accuracy of this extraction will be checked by a co-author. Disagreements regarding data extraction will be resolved via discussion amongst the authorship.
Due to the expected heterogeneity of the research designs and potential for both qualitative and quantitative work to be included, a narrative synthesis approach will be used as described by (Popay et al., 2006). Within this process, the main features of the studies will be presented via tables, and the relationships between studies will be explored.

Eligibility criteria Study type and focus
Included studies will report visual search capacity as a primary outcome measure. Visual search can be assessed by any means, inclusive of digital and paper-based tests (e.g., the Star Cancellation Test (Bailey et al., 2004) or the Landolt C cancellation task (Parton et al., 2006)). Methods of measuring visual search are likely to include search efficiency, response bias, reaction speed, variability and search accuracy. Eye-tracking metrics may be reported that indicate areas of attention and inattention such as fixation duration and count, scan path, saccade length, saccade velocity, and time between target fixations. The measurement of visual search capacity may be coupled with neurocognitive measures such as electroencephalography, Functional Magnetic Resonance Imaging (fMRI), and Functional Near-Infrared Spectroscopy (fNIRS). Alongside visual search testing, participants may be screened for cognitive or motor impairment.
The 'think aloud' technique, where a participant voices their thought processes as they complete a visual search task may be utilised by certain studies. No restrictions will be placed on test settings or geographical location for this scoping review. Both applied and laboratory-based studies are eligible for inclusion.
Peer-reviewed, published qualitative and quantitative literature in which visual search is reported as a primary outcome measure will be eligible for inclusion within this review. Case reports, case studies, grey literature or theses will not be included. Systematic reviews, narrative reviews, meta-analyses and commentaries will also not be included.
Sample

Studies that sample populations of adults who have experienced an Ischemic Stroke or a Primary Intracerebral Haemorrhage will be included. Populations that have experienced a Transient Ischemic Attack, Secondary Intracerebral Haemorrhage, Subdural Haemorrhage or a Subarachnoid Haemorrhage will not be eligible for inclusion. No exclusions will be made based on the number or severity of stroke, or the gender, sex, ethnicity, geographic location or age of the participant, provided that they are over 18 years old.

Some studies may sample a population of stroke survivors as part of a wider group of people with visual impairment or combine adult and paediatric data. In these cases, the authors of these studies will be contacted and the separated data specific to stroke survivors will be requested. If this data is unavailable, the studies will be excluded from the final analyses.

Source of evidence screening and selection An information specialist (CH) was consulted to design and pilot the search strategy. The stroke-specific part of the search strategy was consistent with that developed by the Cochrane Stroke Group (Cheyne, 2020), and visual search-specific terms were determined by manually reading abstracts and titles until all new search terms were exhausted.

A piloting phase was undertaken whereby various terms were trialled to assess the volume and relevance of returned searches. For example, searches using the terms “attention” and “perception” returned 600,000 results that were often focused on broader psychological study. The search was therefore refined and used the terms “visual attention” and “visual perception” instead.

The following databases will be searched: EMBASE (Ovid), Medline (Ovid), CINAHL (EBSCOhost), PsycINFO (EBSCOhost) and Cochrane Library (all databases, via Wiley).

The search strategy that will be used for Ovid MEDLINE® is reported below. This search strategy will be translated for each database by an information specialist (CH). Filters available within the database searches (human, English language for example) will not be applied. Where applicable, standardised search terms such as Medical Subject Headings (MESH) will be used.

Ovid MEDLINE® Search strategy:

exp brain ischemia/ OR exp brain infarction/ OR exp intracranial hemorrhage/ OR exp cerebral hemorrhage/ OR exp subarachnoid hemorrhage/ OR exp stroke/ OR exp cerebrovascular accident/ OR exp cerebral ischemia/ OR exp ischemic stroke/ OR "intracranial haemorrhage".tw. OR "cerebral haemorrhage".tw. OR "subarachnoid haemorrhage".tw. OR "stroke rehabilitation".tw. OR "poststroke".tw. OR "post-stroke".tw. OR "hemorrhagic stroke".tw. OR "haemorrhagic stroke".tw.

AND

exp pattern recognition, visual/ OR "visual search".tw. OR "visual-spatial search".tw. OR "visual target".tw. OR "visual scanning".tw. OR "visual exploration".tw. OR "hemianopia".tw. OR "visual inattention".tw. OR " Quantranopia".tw. OR “scotoma".tw.

OR "visual field deficit".tw. OR "visual scanning".tw. OR " visual perception".tw. OR " visual attention".tw.

Data management Quality assessment or risk of bias analysis is not applicable at the scoping review stage. All data pertaining to this review will be stored within the University of Central Lancashire’s IT network.

Language restriction Studies must be written in English or have a professionally translated English version to be included within this scoping review.

Country(ies) involved United Kingdom.

Keywords Haemorrhagic Stroke; Intra-cerebral Haemorrhage; Visual neglect; Visual impairment; Visual field deficit.

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