# Post-Stroke Suicidality: Risk Factors and Factors Influencing Screening People with Aphasia

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## Thesis Portfolio Abstract

**Background:** Stroke is associated with increased suicidality, making it important to identify associated risk factors and ensure guidance to assess for suicidality is followed. Risk factors associated with post-stroke suicidal ideation have been reviewed, but not completed suicide. Research indicates that stroke professionals report reduced intention to screen suicidality in people with post-stroke aphasia (PwA).

**Method:** A systematic review was conducted to synthesize research on risk factors associated with completed suicide post-stroke. Eighty-six UK and Australian Speech and Language Therapists (SLTs) working with PwA participated in a Theory of Planned Behaviour online experimental vignette study, testing if normative beliefs influence intention to screen suicidality in PwA. A mixed factorial design compared intention from random allocation to groups that read a vignette emphasizing a normative belief that either suicidality or dysphagia should be assessed.

**Results:** A narrative synthesis of 18 studies identified eight factors associated with post-stroke suicide (under 65-years-old; within two-years of stroke; male; employed at time of stroke; additional health complications; shorter hospital admission; pre- and post-stroke depression, and ischaemic stroke). The experimental study found a significant difference between pre- and post-vignette intention to screen for suicidality, suggesting that normative beliefs have a positive impact on screening intent. Content analysis highlighted barriers to suicidality screening with PwA: competence, confidence, and role expectations, as well as facilitators: training, clear expectations, resources, and additional support.

**Conclusions:** More effort is needed to report as much information as possible within stroke research to gain a better understanding of the factors most associated with post-stroke suicide. The inclusion of normative beliefs increases self-report rated intention to screen for suicidality. The reasons for not screening for suicidality in PwA are multifaceted. The portfolio highlights recommendations for research and clinical care.[1]

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[1] I acknowledge that material from my ClinPsyD Thesis Proposal has been used throughout this portfolio, due to the inherent necessity to re-use material in this instance.

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# Chapter 1 – General Introduction

Introducing stroke, suicidality, post-stroke aphasia, and the Theory of Planned Behaviour

# General Introduction

This thesis focuses on two possible consequences of stroke: suicidality (a range of behaviour that poses the risk of killing oneself, including thoughts of suicide, the presence of a suicidal plan, or intent to end one's life; Posner et al., 2014) and aphasia (an acquired loss or impairment of language function caused by brain damage; Benson & Ardila, 1996). More specifically, this thesis aims to inform post-stroke suicide prevention in adult stroke survivors, by identifying risk factors associated with completed suicide post-stroke, and testing whether normative beliefs influence the intention of Speech and Language Therapists (SLTs) to screen people with post-stroke aphasia (PwA) for suicidality.

This thesis follows on from previous research conducted at the University of East Anglia (UEA) which focused on stroke professionals in the United Kingdom (UK) but collaborated with members of the Centre for Research Excellence in Aphasia Rehabilitation and Recovery in Australia (Schlesinger, 2021; Schlesinger et al., 2023). As Australia is a forerunner in stroke and aphasia healthcare, with dedicated aphasia research centres in Queensland and Victoria, we extended this thesis to recruit in both the UK and Australia.

## Stroke

Someone in the world will have a stroke every 2 seconds, resulting in 15 million new strokes per year (Lindsay et al., 2014). The frequency of strokes worldwide is increasing, as 1 in 4 people will have a stroke in their lifetime (Feigin et al., 2022). Johnson et al. (2016) define a stroke as "a sudden death of some brain cells due to lack of oxygen when the blood flow to the brain is lost by blockage or rupture of an artery to the brain" (p. 634). It remains the second leading cause of death, and third leading cause of death and disability combined worldwide, with over 101 million people across the globe living with the aftermath of experiencing a stroke (Feigin et al., 2022).

There are two main types of stroke: ischaemic (a result of a blood clot blocking a blood vessel in the brain) and haemorrhagic (caused by a bleed in the brain resulting from a leaking or burst blood vessel). The majority of strokes are ischaemic, accounting for 85% of strokes in the UK (Stroke Association, 2022a) and over 62% worldwide (Feigin et al., 2022). Ischaemic strokes occur due to a process called atherosclerosis, in which arteries in the brain or neck become narrowed or blocked with plaques, or small vessel disease. There are currently over 77 million people living who have experienced an ischaemic stroke globally (Feigin et al., 2022). Haemorrhagic strokes, on the other hand, account for 15% of strokes in the UK (Stroke Association, 2022b) and over 28% worldwide (Feigin et al., 2022). Haemorrhagic strokes can be intracerebral, in which blood leaks out of a blood vessel into brain tissue, or subarachnoid, where blood leaks out of a blood vessel on the surface of the brain and penetrates the protective layer of fluid surrounding the brain. Currently, there are over 29 million people worldwide who have experienced a haemorrhagic stroke (Feigin et al., 2022). Haemorrhagic strokes have worse prognosis and are more fatal, especially in the subacute and acute phases (Unnithan et al., 2023).

The number of people who survive stroke is increasing worldwide, particularly in the western world (Donkor, 2018). Almost two-thirds of stroke survivors leave hospital with a disability (Stroke Association, 2020), and surviving a stroke has the potential to be associated with poorer quality of life. Strokes can result in changes to cognition, emotions, and behaviour, which can impact day-to-day life and lead to a greater reliance on others to support everyday activities of daily living (National Institute of Neurological Disorders and Stroke, 2023), negatively affecting both mental and physical health (Haley et al., 2011). Strokes are now occurring more frequently in younger generations; with 63% of strokes happening to people younger than 70 years old (Feigin et al., 2022), leading to greater unemployment (van der Kemp et al., 2019), social restrictions, and negative change in relationships and families (McKevitt et al., 2011). Stroke is no longer a disease of the elderly, and the public health burden of stroke is rising due to the increasing number of people impacted by stroke, making stroke rehabilitation a greater priority.

Stroke rehabilitation is a multidimensional process, that aims to improve quality of life through the restoration, or adaptation to loss, of function as a result of stroke (National Institute for Health and Care Excellence [NICE], 2023). UK stroke rehabilitation has significantly improved in recent decades. A Consensus Conference on Stroke held in 1988 concluded how stroke care and services were poorly organised, with rehabilitative treatments being used despite having limited, or unconvincing, evidence, and poor outcomes compared to similar healthcare systems around the world (Karla & Walker, 2009). In order to improve patient care, urgent action at a national level was promoted as a priority in the UK, including a guideline and evidence-based approach to improving the organisation, planning, and implementation of services. In response, a multidisciplinary intercollegiate working group was set up, comprising major stakeholders in stroke care as well as patients and voluntary organisations, and comprehensive guidelines for stroke care were developed (Intercollegiate Stroke Working Party [ISWP], 2000). Additionally, the National Sentinel Stroke Audits were introduced in the UK as a benchmarking tool to evaluate change in the quality of stroke care provided (Royal College of Physicians, 2010). A similar mechanism was set up in Australia in 2007 by the Stroke Foundation (2020a), in which the National Stroke Audit monitors and measures stroke care.

Stroke rehabilitation guidelines have been published and updated as understanding and treatments have developed. For example, in the UK, NICE published clinical guidelines for stroke rehabilitation in adults in 2013, which were updated in 2019 and 2023 (NICE, 2023), and the ISWP updated their clinical guidelines in 2023 (ISWP, 2023). The National Stroke Service Model (National Health Service, 2021a) also set out clear standards for stroke care. In Australia, the national guidelines published by the Stroke Foundation are living guidelines which are updated as new evidence emerges (Stroke Foundation, n.d.). Despite these guidelines including a focus on both physical and psychological functioning, only 9% of acute stroke services across the UK include clinical psychology support (ISWP, 2022), and approximately two-thirds of acute stroke services in Australia do not have active psychology support (Stroke Foundation, 2021), suggesting the psychological needs of stroke survivors need to be understood and identified by other health professionals.

## Suicide

Suicide is defined as a death which is caused by self-directed injurious behaviour, with intent to die (National Institute of Mental Health, 2023). Critical to the definition of suicide is the concept of intent; suicide is an intentional act (Wreen, 1988). Suicidality, on the other hand, refers to a range of behaviour that poses the risk of killing oneself, and therefore includes thoughts of suicide, the presence of a suicidal plan, or the intent to end one’s life (Posner et al., 2014).

Suicide is not a recent concern; it is an act that has existed for centuries. In Western cultures, attitudes towards suicides have been complex and varied throughout this time, but the prevailing belief for many centuries, across many cultures, was that suicide was a criminal act and individuals were punished for this (Tondo, 2014). Although this has changed over time, there remains to this day a continuing stigma of suicide (Kučukalić & Kučukalić, 2017) which may lead to an underestimation of the number of suicides in the UK, even today.

Globally, someone dies by suicide every 40 seconds (World Health Organisation, 2021a) and more than one in 100 deaths (1.3%) worldwide is a suicide (World Health Organisation, 2021b). This equates to over 700,000 deaths by suicide worldwide each year. Across the world, suicide rates are twice as high among men than women (World Health Organisation, 2021b). In the UK, 74% of suicides are male (Office for National Statistics, 2022), and it is the leading cause of death among men under the age of 50 (Department of Health & Social Care, 2022). Similarly, in Australia, 75% of suicides are male (Australian Bureau of Statistics, 2022).

The impact of a suicide is far-reaching; it is estimated that between six (Clark & Goldney, 2000; Jordan & McIntosh, 2011) and 60 (Berman, 2011) close friends and relatives are deeply affected by every death by suicide, and 135 people are exposed to each suicide (Cerel et al., 2019). The most recent UK statistics report 5,583 deaths by suicide in 2021 (Office for National Statistics, 2022); meaning that anywhere between 33,498 and 753,705 people in the UK were affected by suicide and around 95 million people worldwide (Cerel et al., 2019).

Since Durkheim's *Le Suicide* (1897), many psychologists and sociologists have developed theories to explain why people take their own life. Central to these theories is the premise that one overwhelming factor drives suicidal ideation, such as wanting to escape (Baechler, 1975; Baumeister, 1990), hopelessness (Abramson et al., 1998; Schotte & Clum, 1987), and entrapment (Gilbert & Allan, 1998; Williams, 1997). The primary criticism of these theories is that, although they provide an explanatory framework for the development and maintenance of suicidal ideation, they do not explain why people do not act on these thoughts (Rodríguez-Otero et al., 2021). This led to the development of what is known as 'ideation-to-action' theories, such as the Interpersonal Theory of Suicide and the Integrated Motivational-Volitional Model (IMV; O'Connor, 2011; O'Connor & Kirtley, 2018). The IMV is a multivariate framework that conceptualises suicide in three phases: vulnerability (pre-motivational), motivation (motivational) and action (volitional). O'Connor suggests that when a person has chosen to act on their suicidal thoughts, it is the 'case fatality rate' – the lethality of their chosen method that most determines whether they survive or die (O'Connor, 2021). In 2018, the IMV was refined to more specifically include eight distinct factors which act as volitional moderators, or factors associated with an increased likelihood that someone will act on their suicidal thoughts (O'Connor & Kirtley, 2018).

## Post-Stroke Suicidality

Stroke is associated with a substantial risk of suicidality (Pompili et al., 2012). Post-stroke depression, associated with the increased risk of suicidality (Faber, 2003; Pohjasvaara et al., 2001) is common, affecting a third of stroke survivors (Hackett & Pickles, 2014). Stroke survivors also experience suicidal ideation at a rate double that of the general population (Fuller-Thomson et al., 2012; Santos et al., 2012), although prevalence of post-stroke suicidal ideation varies between studies dependent on the methodology used to identify suicidal ideation. Some studies have used purposively developed measures, such as the Beck Scale for Suicidal Ideation, to measure and quantify suicidal ideation in their participants, while others identify the presence of suicidal ideation from scales that were developed to assess depression and include one question on suicidality (Vyas et al., 2021; Zhang et al., 2022). A meta-analysis of over 10,000 stroke survivors reported a pooled proportion of suicidal ideation of 11.8% (Posner et al., 2014), and similarly, another meta-analysis of over 17,000 participants reported a pooled prevalence of 12.2% (Chen et al., 2021).

Suicidal plans are also common amongst stroke survivors, with 11.3% of stroke survivors forming suicidal plans within two years of their stroke; showing an increase in prevalence over time, from 6.6% of stroke patients during initial hospital admission (Kishi et al., 1996). This represents almost a doubling of prevalence and highlights that post-stroke suicidality is an ongoing concern that requires ongoing support. A recent systematic review found that stroke survivors with post-stroke depression have 73% higher risk for suicidality than a non-stroke population (Vyas et al., 2021), and suggested that people who have had a stroke are 63% higher risk of dying by suicide, than those who have not experienced a stroke or post-stroke depression. An epidemiological study found the prevalence of completed suicide to be 7.2% in stroke survivors (Stenager et al., 1998), compared to 1.1% of the general population (Office for National Statistics, 2022). Vyas et al. (2021) found that the risk of suicide in stroke survivors is similar to that seen in people with cardiac and lung conditions, however stroke is likely to affect cognition and communication to a greater extent, potentially creating additional barriers to engagement with therapeutic support. There is a clear need to better understand suicidality in stroke survivors and how future deaths can be prevented.

There are multiple factors thought to play a role in the emergence of suicidality after stroke. These include existential distress (Nilsson et al., 1999), length of hospital stays (Selvaraj et al., 2022), additional health complications (Zhang et al., 2022) and cognitive deficits, including impaired executive functioning (McGirr et al., 2009) and deficient risk processing (Ding et al., 2017). However, post-stroke suicidality is under-researched, especially when compared to research on post-stroke depression and requires further research to identify factors that may be associated with an increased likelihood of dying by suicide after experiencing a stroke.

## Aphasia and Screening for Suicidality in People with Aphasia

One possible risk factor for increased suicidality post-stroke is aphasia; a consequence of stroke defined as “an acquired loss or impairment of language function caused by brain damage” (Benson & Ardila, 1996, p. 3). Aphasia impacts an individual’s ability to understand or communicate language, which can be categorised dependent on the presentation. Expressive aphasia is characterised by difficulties communicating thoughts and ideas to others, whereas receptive aphasia is characterised by difficulties in understanding things others are trying to communicate to them. This can be via speech, writing, pictures, and gestures (Sarno, 1998). Global aphasia, on the other hand, is caused by damage to extensive portions of the language areas of the brain and results in severe communication difficulties in which a person’s ability to speak or comprehend language is significantly limited (National Institute on Deafness and Other Communication Disorders, 2017). In most cases, aphasia is caused by strokes involving the left hemisphere, and more extensive damage is typically associated with more severe aphasia, which in turn is associated with poorer outcomes (Pedersen et al., 1995, 2004; Plowman et al., 2012).

Approximately one in three stroke survivors live with aphasia (Flowers et al., 2016). It is well documented that recovery from aphasia following stroke varies considerably. How people respond and adjust to their stroke and aphasia depends on the value and meaning attached to language within their occupational and familial roles, as well as their coping style, resources and social networks (Code & Herrmann, 2003). However, for those who do not recover, depression and anxiety are common. Anxiety is estimated to be experienced by up to 44% of PwA (Morris et al., 2017), and depression between 60–72% (Lincoln et al., 2011). Similarly, aphasia is negatively associated with quality of life (Hilari et al., 2012), relationship changes (Code & Herrmann, 2003), social networks (Davidson et al., 2008), and self-identity (Shadden, 2005). PwA are also more likely to experience social isolation (Code & Herrmann, 2003).

PwA are at greater risk of developing depression compared to the general public and to stroke survivors who do not have aphasia (De Ryck et al., 2014; Kauhanen et al., 2000; Shehata et al., 2015; Worrall et al., 2016), therefore the presence of post-stroke aphasia is seen to increase suicidality risk further (Perrotta, 2020). Multiple guidelines advocate assessing all stroke survivors for low mood and suicidality, not exclusive to PwA (Canadian Coalition for Seniors' Mental Health, 2006; Duncan et al., 2005; Her Majesties Government Department of Health, 2012; Intercollegiate Stroke Working Party, 2023; NICE, 2023). Carota et al. (2016) also recommend screening PwA for suicidality specifically. Screening refers to "a way of identifying apparently healthy people who may have an increased risk of a particular condition" (National Health Service, 2021b), and typically involves the use of simple tests (World Health Organisation, 2020).

There is a debate about who is "responsible" for completing suicidality screening. Within suicidology, the general consensus is that primary care practitioners (such as General Practitioners) are best placed to complete this screening for the majority of people (Dueweke & Bridges, 2018; Jenkins & Kovess, 2002; Milner et al., 2017), as research has found higher levels of contact with primary care in the months prior to completing suicide, often involving contacts unrelated to mental health (Luoma et al., 2002; Mughal et al., 2023; Stene-Larsen & Reneflot, 2019). However, these practitioners do not receive much training in suicidality screening and may have misplaced beliefs about the impact of completing this. For example, many general practitioners do not feel comfortable or confident in screening for suicidal ideation and worry doing so could induce thoughts of self-harm or suicide, and increase suicide risk (Bajaj et al., 2008; Feldman et al., 2007; Schulberg et al., 2004). Therefore, despite a central component of guidelines for the assessment and treatment of depression recommending primary care professionals ask patients about suicidal ideas and intent (NICE, 2022a), studies report low screening levels within this setting (Bryan et al., 2008; Feldman et al., 2007).

The presence of aphasia complicates this further. Screening for suicidality in PwA is a challenging task; not just due to the communication deficits, but also a lack of validated and aphasia-friendly measures. Available screening measures for mood-related difficulties rely heavily on verbal or written assessments, which creates clear barriers for PwA. In response to this, specific tools have been developed to measure mood in PwA (Barrows & Thomas, 2018; Benaim et al., 2004; Lincoln et al., 2000; Stern et al., 1997; Turner-Stokes et al., 2005), but a systematic review of their reliability, validity, and feasibility concluded most were of low methodological quality (van Dijk et al., 2016). Additionally, many of these measures do not include questions on suicidality, and therefore may not reflect the totality of a person’s risk (Hackett et al., 2010). Moreover, research on the use of screening measures with occupational therapists in a stroke service suggested that, even when measures do include a specific and direct question on suicidality and protocols are in place to guide professionals to this question, there is no evidence that this question is asked (Kneebone et al., 2013).

SLTs are the professional group most likely to work with PwA and the professional group with most training in working with people with communication difficulties (Royal College of Speech and Language Therapists, n.d.; Stroke Association, 2021a). Nevertheless, some have reported feeling that screening and working with mental health concerns is outside the scope of their practice (Cruice & Ten Kate, 2019; Northcott et al., 2018; Sekhon et al., 2015), due to limited training in this area (Doud et al., 2020; Sekhon et al., 2022). However, it has also been shown that psychologists do not feel confident working with PwA (Baker et al., 2021), and the presence of psychologists in stroke services is limited (ISWP, 2021, 2022; Stroke Foundation, 2020b, 2021). Therefore, PwA often fall through the gap in terms of scope of practice. In a Theory of Planned Behaviour (TPB) study, Schlesinger et al. (2023) found that stroke professionals, including SLTs, report routinely screening for low mood, but rarely screen for suicidality.

## Theory of Planned Behaviour

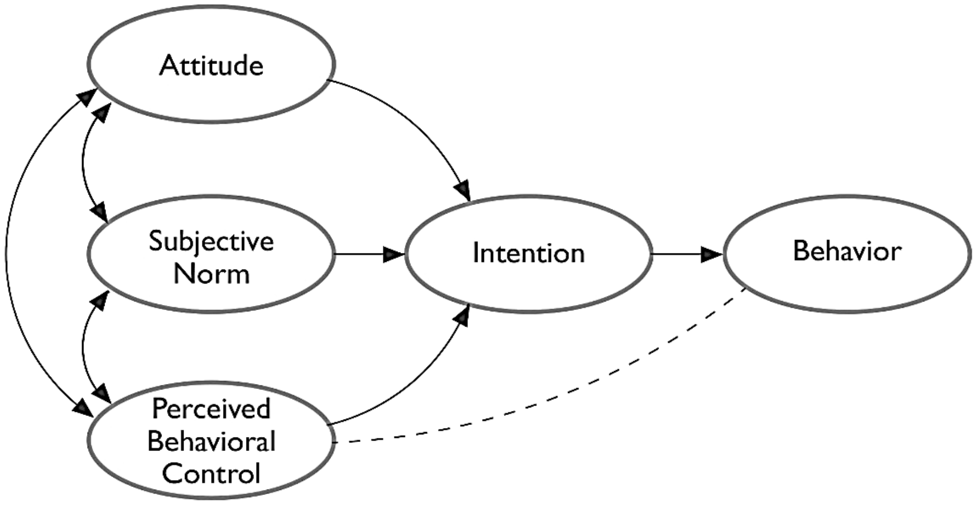
One lens through which the intentions and behaviour of professionals can be understood is the Theory of Planned Behaviour or TPB (Ajzen, 1985). The TPB is one of the most frequently cited models for the prediction of human behaviour (Ajzen, 2011) and suggests that beliefs form the basis for decision-making and behaviour. More specifically, a person's attitudes, normative beliefs, and perceived behavioural control shape their behavioural intentions and behaviour (Figure 1). Within the model, attitudes are defined as the degree to which a person has a favourable or unfavourable evaluation of the behaviour (e.g., "screening for suicidality is helpful"). Subjective norms are understood as the perception of social expectations to adopt a particular behaviour, and are influenced by normative beliefs, which concern the extent that significant others have preferences as to whether one should or should not engage in the behaviour (e.g., "my manager expects me to complete suicidality screening"). Normative beliefs will be referred to within this thesis portfolio. Finally, perceived behavioural control refers to an individual's perception of the ease or difficulty of performing the particular behaviour, and is influenced by having access to the necessary resources and opportunities to perform the behaviour successfully (e.g., "I have the required skills and easy access to the correct tools to complete suicidality screening").

The TPB has been found to predict behavioural intentions throughout multiple areas of research, including criminal justice (e.g., Ishoy, 2016; Keller & Miller, 2015), marketing (e.g., Alavion et al., 2017; Han &

Stoel, 2017; Lavuri, 2022) and education (e.g., Cheon et al., 2012; Jadgal et al., 2020). Further, TPB has successfully predicted health-related behavioural intention in several studies. Specific behaviours, such as healthy eating (Conner et al., 2002), smoking cessation (Norman et al., 1999), and oral health (Soltani et al., 2018) behaviours performed by parents to promote their child's health (Hamilton et al., 2020) have made use of TPB to understand behaviour and provide recommendations for intervention.

**Figure 1**

*A Visual Representation of the Theory of Planned Behaviour (Ajzen, 1985)*



Importantly, there is a developing literature within stroke rehabilitation research making use of the TPB model. This literature has successfully applied the TPB to staff intentions and behaviours within stroke services (Ab Malik et al., 2018; Gillespie et al., 2020; Hart & Morris, 2008; Schlesinger et al., 2023; Tambi et al., 2019). For example, Gillespie et al. (2020) found that stroke clinician intention to provide non-pharmacological interventions for post-stroke emotionalism was predicted by attitudes and normative beliefs.

With specific reference to screening behaviours within stroke services, Hart & Morris (2008) found that the TPB was effective in understanding screening behaviours in staff screening for depression. They found that normative beliefs ($t(72) = 4.136$, $P < 0.001$) and perceived behavioural control ($t(72) = 4.550$, $P < 0.001$) predicted staff intentions to screen. Similarly, Schlesinger et al. (2023) examined the extent to which the TPB accounted for staff intentions to screen mood in PwA. They found that TPB variables accounted for 48% of variance in staff intention to screen PwA for depression, with normative beliefs being a significant predictor of intention to screen for depression. A common link across these TPB studies is the prediction of staff behavioural intentions from normative beliefs.

## Current Thesis

This thesis presents a systematic review of risk factors for completed suicide after stroke. Most research on post-stroke suicidality has focused on suicidal ideation and as yet, there is limited research on risk factors contributing to completed suicide post-stroke. It is important to understand that factors which contribute to suicidal ideation may differ from those which contribute to completed suicide and to better understand the risk factors for completed suicide amongst stroke survivors. The systematic review is followed by the first online experimental TPB study to test whether communicating a normative belief increases staff intention to screen suicidality in PwA. This study focuses on SLTs, as the most qualified professionals to work with PwA, across the UK and Australia. Qualitative data will provide additional information on perceived facilitators and barriers to screening.

# Chapter 2 – Systematic Review

## Risk Factors Associated with Completed Suicide after Stroke: A Systematic Review

# Risk Factors Associated with Completed Suicide after Stroke: A Systematic Review

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## Abstract

**Background:** Stroke survivors are at greater risk of suicidal ideation, attempts, and completed suicides than the general population. There is no systematic review on risk factors contributing to completed suicide post-stroke. This review aimed therefore to synthesize research on factors associated with completed suicide amongst stroke survivors.

**Methods:** Four databases (CINAHL Complete, APA PsycInfo, MEDLINE Ultimate, and PubMed) were searched from inception to November 2023. Inclusion criteria were original research studies published in English that examined completed suicide in stroke patients. The Newcastle-Ottawa Scale was used to assess risk of bias. A narrative synthesis was conducted.

**Results:** Of 979 records identified, only 18 investigated completed suicide after stroke and were included. Eight factors associated with post-stroke suicide were identified: age under 65-years-old, occurrence within two years of stroke, male gender, employment at the time of stroke, shorter hospital admission, pre- and post-stroke depression, and ischaemic stroke. Furthermore, seven additional factors were of interest, but yielded insufficient data to draw conclusions: marital status, living arrangements, location of stroke, severity of stroke, impact of stroke, education level, and ethnicity.

**Conclusion:** Several sociodemographic features: age, sex, and employment status, and stroke variables: pre- and post-stroke depression, stroke type, complications, admission duration, and time post-stroke, are associated with completed suicide post-stroke. The extent to which these could be determined was limited by variability in quality and quantity of results reported in included studies. There remain questions around some variables due to limited information recorded in the articles. It is recommended that future stroke research report demographic and stroke characteristics in detail to determine higher risk groups more accurately.

**Keywords:** Post-stroke suicide, completed suicide, risk factors

**Abbreviations and Acronyms:**

NOS – Newcastle-Ottawa Scale

## Introduction

Stroke is the second leading cause of death worldwide[1] affecting 15 million people each year: with five million people dying and 30% experiencing residual disabilities[2]. Improvements in stroke care have driven down age-standardised stroke mortality across age groups[3]. However, surviving a stroke frequently disrupts cognition, emotions, and behaviour, and increases reliance on others[4], resulting in adverse changes to relationships and social isolation[5], and reduced quality of life[6].

Stroke is associated with substantial risk of suicidality[7], including thoughts of suicide, plans to attempt suicide, intention to act on these plans[8], and completed suicide[9]. A recent systematic review found that people with post-stroke depression had a 73% higher risk of suicidality than the general population[10]. There are many contributing factors for the development of suicidality, including biological, psychological, clinical, social, and environmental variables[11]. Research suggests that cognitive impairments[12], impaired executive functioning[13] and reduced prefrontal cortex functioning including deficient risk processing[14], contribute to suicidality. Post-stroke cognitive impairment is common[15-16]. It is increasingly recognized as a direct risk factor for the development of post-stroke depression[17-19] and suicidal behaviour[7], and an indirect risk factor through its association with depression and bias of information processing towards more negative appraisals[20].

Stroke survivors experience higher rates of suicidal ideation, suicide attempts, and completed suicides than the general population[7,10,21-22]. The prevalence of post-stroke suicidal ideation varies between studies, due to methodological differences in identifying suicidal ideation. Zhang et al.[23] and Chen et al.[24] and found that 12% of stroke survivors report suicidal ideation; Santos et al.[25] and Fuller-Thomson et al.[26] report stroke survivors experience suicidal ideation at a rate roughly double the general population (OR = 2.07, 95% CI = 1.68-2.55). Similarly, suicidal plans are prevalent post-stroke[10]. Kishi et al[27] identified that 6.6% of stroke patients formed suicidal plans during hospital admission, increasing to 11.3% during 2 years of follow-up. An epidemiological study found the prevalence of completed suicide after stroke to be 7.2%[28], compared to 1.1% in the general population[29]. A later study reported completed suicide rates to be 0.38% during first five years post-stroke and 0.02% after 10 years[30]; more than double the general population at 0.01%[29].

Suicide prevention spans individual and population approaches, drawing on a range of diverse strategies and methods[9], including identification of those at risk through screening and formulation of risk factors. Formulation of suicide risk is vital in general, not only in stroke, given that multiple factors are known to be associated with suicide risk[31] and no single risk factor has been found to strongly predict suicide[32-33]. These include, but are not limited to, age[34], ethnicity[35], social support and physical illness[36], mood and substance-related disorders[37]. Additionally, martial status[38], gender[34,39], parental[40] and employment status[41] are known to be associated with risk of suicide. Similarly, national guidelines for suicide prevention recommend suicidality screening in people with known suicide risk factors, including stroke[42-43]. Clinical guidelines for stroke recommend completing a psychosocial assessment of all stroke survivors, including suicidality[44-46]. Consistent with this, UK stroke guidelines were recently updated to recommend assessment of mental health including suicidality[4,47].

Previous systematic reviews and meta-analyses focused on synthesizing risk factors for suicidal ideation after stroke[21,23-24] or a combination of ideation, plans, attempts and completed suicide[,7,10,48]. It is important to bear in mind, however, that factors associated with suicidal ideation may differ from those associated with completed suicide[9] and to better understand the risk factors for completed suicide amongst stroke survivors. Effective suicide prevention strategies depend on the identification of specific risk factors[49], so increased understanding of risk factors is imperative. Although previous reviews of post-stroke suicidality have included completed suicide[7,10,48], this is the first systematic review to focus solely on identifying risk factors for completed suicide in adult stroke survivors, providing a more up-to-date and in-depth review on completed suicide post-stroke.

## Method

This systematic review was registered on the International Register of Prospective Systematic Reviews (PROSPERO) (registration number: CRD42023395893) and followed PRISMA guidelines[50] (Appendix B).

### Search Strategy

A predetermined search string, developed in consultation with a specialist librarian, of ‘stroke’, ‘suicide’, and ‘following’ and their synonyms was used (Appendix C). Four bibliographic databases (CINAHL Complete, APA PsycInfo, MEDLINE Ultimate, and PubMed) were searched from inception to November 2023 to check for additional publications. Reference lists of key publications[10,23] were searched for additional research articles.

### Eligibility Criteria and Study Selection

Titles and abstracts were screened to identify studies that included both suicide and stroke (Figure 1). Review exclusion criteria were: review articles; articles not written in English; not including completed suicide; a focus on suicide that was not post-stroke; studies of children or adolescents; and studies of people with dementia or transient ischaemic attack. The inclusion criteria were original research studies that included completed suicide in stroke patients. Studies of completed suicide after stroke were retained for full text review. The number of studies that included suicidal thoughts, plans or attempts, but not completed suicide, was recorded. A second reviewer (JB) independently reviewed a random sample of 20% of studies being screened, and 20% of those included for full text review, to confirm eligibility criteria were met. There was agreement in 100% of cases ($k = 1$).

### Data Extraction

As recommended by Higgins et al. (2019)[51], data was extracted on study characteristics (author, date, country, design, and sample size); participant characteristics (age at death, time since stroke, sex, employment status, marital status, living arrangements, education level, and other characteristics); and clinical characteristics (time spent in hospital, location of stroke, severity of stroke, type of stroke, effects following stroke, and other health complications) where available. The information extracted from each study was also guided by known suicide risk factors, such as sex[34], age[34], ethnicity[35], social support[36], and physical illness[36]. The data from 20% of included articles was cross-checked by a second extractor (JB), and there was agreement in 100% of studies (k = 1).

## Quality Assessment

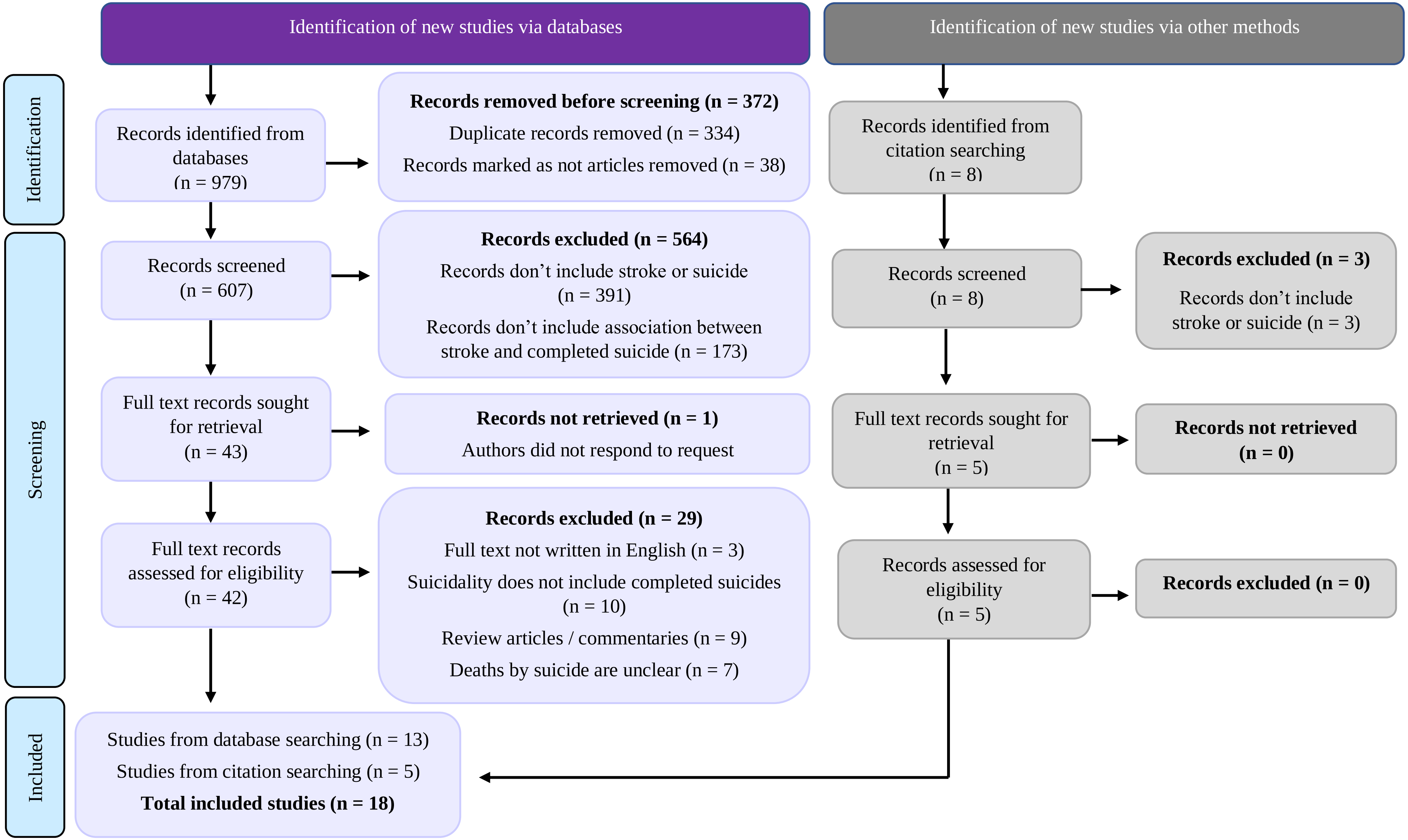
There is a lack of consensus on the most appropriate critical appraisal tool for observational studies[52-53]. The Newcastle-Ottawa Scale (NOS) was chosen because it is a risk of bias assessment tool for observational studies recommended by the Cochrane Collaboration[51] and the most used tool for cohort and case-control studies[54]. The NOS provides a star-based system on three domains: selection of study groups; comparability of groups; and ascertainment of exposure/outcome. The NOS has separate tools for cohort studies and case-control studies (Appendix D); each comprises eight items, with an overall quality rating of ‘good’, ‘fair’, or ‘poor’. A second reviewer (JB) independently appraised a random sample of 20% of papers, and there was agreement in 100% of studies (k = 1).

## Strategy for Data Synthesis

Authors were contacted for data that were not included in the published research. A narrative synthesis was conducted following guidance by Popay et al. (2006)[55], with similarities and differences between study findings appraised and participant and clinical characteristics synthesized to determine potential risk factors. Variables were identified as risk factors for completed suicide after stroke: a) if a statistically significant difference was found between stroke and non-stroke populations within the research, or b) increased frequency of occurrence was reported for in suicide completers compared to non-completers, or c) based on consideration of individual author conclusions.

**Figure 1**

*PRISMA Flowchart*



# Results

## Study Selection

Database searching identified 979 records (Figure 1). After removing 334 duplicates and 38 records that were not research articles, 607 papers were screened against inclusion criteria. Eighteen (2.97%) met inclusion criteria for the systematic review.

Of the papers that did not meet inclusion criteria, most (n=564, 92.91%) did not cover stroke and completed suicide: 391 (69.33%) did not report on either stroke or suicide, and 173 (30.67%) did not report an association between stroke and completed suicide. As a result, 43 were retained for full text review. Of these, one (0.10%) was unavailable for retrieval, three (0.31%) were not available in English, nine (0.93%) were review articles, and 10 (1.03%) referenced suicidality but did not include completed suicide within analysis. Additionally, in seven studies (0.72%) deaths by suicide in stroke survivors were unclear, as the research had combined different populations (e.g., stroke and heart attack).

## Quality Appraisal

Most of the studies (n=15) included received a ‘good’ rating, three received a ‘fair’ rating and none received a ‘poor’ rating. Table 1 summarises the quality assessment for each paper.

**Table 1**

*Summary of Quality Assessment of Included Studies*

| Case-Control Studies | Cole 2002[56] | Jia 2014[57] | Katayama 2010[58] | Waern 2002[59] | Webb 2012[60] |
|---|---|---|---|---|---|
| 1. Is the case definition adequate? | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 |
| 2. Representativeness of the cases | 🟥 | 🟩 | 🟥 | 🟩 | 🟩 |
| 3. Selection of controls | 🟩 | 🟩 | 🟥 | 🟩 | 🟩 |
| 4. Definition of controls | 🟩 | 🟩 | 🟥 | 🟩 | 🟩 |
| 5. Comparability of cases and controls on the basis of the design/analysis | 🟩 | 🟩 | 🟥 | 🟩 | 🟩 |
| 6. Ascertainment of exposure | 🟥 | 🟩 | 🟩 | 🟩 | 🟩 |
| 7. Same method of ascertainment for cases and controls | 🟩 | 🟩 | 🟩 | 🟥 | 🟩 |
| 8. Non-response rate | 🟥 | 🟩 | 🟩 | 🟥 | 🟩 |
| Quality Rating | Fair | Good | Fair | Fair | Good |

*Note.* Green = star rating allocated as per NOS coding manual Red = star rating not allocated as per NOS coding manual[61]

| Cohort Studies | Chang 2018[62] | Choi 2020[63] | Chiu 2020[64] | Crump 2014[65] | Eriksson 2015[22] | Erlangsen 2020[66] | Forsström 2010[67] | Hong 2018[68] | Stenager 1998[28] | Teasdale 2001[69] | Wu 2018[70] | Wyrwa 2021[71] | Yamauchi 2014[30] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Representativeness of the exposed cohort | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 |
| 2. Selection of the non-exposed cohort | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 |
| 3. Ascertainment of exposure | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 |
| 4. Demonstration that outcome of interest was not present at start of study | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 |
| 5. Comparability of cohorts on the basis of the design/analysis | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟥 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 |
| 6. Assessment of outcome | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 |
| 7. Was follow-up long enough for outcomes to occur? | 🟥 | 🟥 | 🟥 | 🟩 | 🟩 | 🟥 | 🟩 | 🟥 | 🟥 | 🟥 | 🟥 | 🟥 | 🟩 |

| Cohort Studies | Chang 2018[62] | Choi 2020[63] | Chiu 2020[64] | Crump 2014[65] | Eriksson 2015[22] | Erlangsen 2020[66] | Forsström 2010[67] | Hong 2018[68] | Stenager 1998[28] | Teasdale 2001[69] | Wu 2018[70] | Wyrwa 2021[71] | Yamauchi 2014[30] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8. Adequacy of follow-up of cohorts | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 |
| Quality Rating | Good | Good | Good | Good | Good | Good | Good | Good | Good | Good | Good | Good | Good |

*Note.* Green = star rating allocated as per NOS coding manual Red = star rating not allocated as per NOS coding manual[61]

## Study Characteristics

Most of the included studies recruited community samples, (n=12, 66%), although a minority were drawn from acute or rehabilitation hospitals (n=6, 33%), with data obtained via secure means such as medical records or death registries. Almost half of the samples were from an Asian country (n=8, 44%), including Taiwan (n=3), South Korea (n=2), China (n=1) and Japan (n=2), and almost half from a European country (n=8, 44%), including Finland (n=1), Denmark (n=3), Sweden (n=3) and the United Kingdom (n=1). A small sample were drawn from the United States of America (n=2, 11%).

Sample sizes ranged from 6 to 664,914, with a combined total of 1,751,735 participants, of whom 3,456 (0.20%) had died by suicide after a stroke. However, as one study did not report the raw number of participants who had died by suicide[70], this number does not reflect the full total of people who had a stroke and died by suicide.

The data reported within studies varied substantially. Age and sex were consistently reported across studies; however, clinical information regarding time since stroke, the type and severity of stroke, and any complications, as well as participant information including employment status and living arrangements were inconsistently reported. Ethnicity was reported in only one study[56].

Tables 2–4 provide further information on included studies, and demographic, and clinical information.

**Table 2**

*Study Characteristics*

| Study ID | Country | Design | Sample Size (Stroke) | Sample Size (Non-Stroke) | Sample Size (%)[a] (Total Death by Suicide) | Sample Size (%)[a] (Stroke & Death by Suicide) |
|---|---|---|---|---|---|---|
| Chang 2018 | Taiwan | Retrospective cohort | 11,385 | 11,385 | N/R | 275 (1.21) |
| Chiu 2020 | Taiwan | Retrospective cohort | 2152 | 145,588 | 38 (0.03) | 31 (0.02) |
| Choi 2019 | South Korea | Retrospective cohort | 42,762 | 85,524 | 378 (0.29) | 236 (0.18) |
| Cole 2014 | USA | Case control | 401 | 3,978 | 217 (5.11) | 30* (0.71) |
| Crump 2014 | Sweden | Cohort | 255,209 | 6,885,380 | 8,721 (0.12) | 250 (0.01) |
| Eriksson 2015 | Sweden | Cohort | 220,336 | 0 | 260 (0.12) | 260 (0.12) |
| Erlangsen 2010 | Denmark | Retrospective cohort | 319,112 | 6,981,283 | 35,483 (0.49) | 1,235 (0.02) |
| Forsström 2010 | Finland | Population | 75 | 2,208 | 2,283 (100) | 75 (3.29) |
| Hong 2018 | South Korea | Retrospective cohort | 7,175 | 0 | 30 (0.42) | 30 (0.42) |
| Jia 2014 | China | Case control | 26 | 174 | 200 (100) | 19 (9.50) |
| Katayama 2010 | Japan | Case reports | 6 | 0 | 4 (66.66) | 4 (66.66) |
| Stenager 1998 | Denmark | Epidemiological | 68,373 | 0 | 140 (0.20) | 140 (0.20) |

| Study ID | Country | Design | Sample Size (Stroke) | Sample Size (Non-Stroke) | Sample Size (%)$^a$ (Total Death by Suicide) | Sample Size (%)$^a$ (Stroke & Death by Suicide) |
|---|---|---|---|---|---|---|
| Teasdale 2001 | Denmark | Population | 114,098 | 0 | 359 (0.31) | 359 (0.31) |
| Waern 2002 | Sweden | Case control | 16 | 153 | 86 (50.89) | 9 (5.33) |
| Webb 2012 | UK | Case control | 522 | 17,811 | 873 (4.76) | 34 (0.19) |
| Wu 2018 | Taiwan | Cohort | 664,914 | 455,273 | 59.6 (CHF)<br>44.6 (AMI)<br>54 (PMI)<br>(death rates) | 57.6 Ischaemic stroke<br>44.6 Haemorrhagic stroke<br>(death rates) |
| Wyrwa 2021 | USA | Retrospective cohort | 241,909 | 1,405,762 | 4102 (0.25) | 447** (0.03) |
| Yamauchi 2014 | Japan | Prospective cohort | 4,793 | 88,234 | 512 (0.55) | 22 (0.02) |

*Note.* $^a$ percentage of death by suicide, and both stroke and death by suicide, in relation to total sample size (stroke and non-stroke combined)

* $p < 0.05$ ** $p < 0.01$ N/R – not reported

CHF – congestive heart failure AMI – acute myocardial infarction PMI – pacemaker implantation

**Table 3**

*Demographic Characteristics of Stroke Survivors who Completed Suicide*

| Study ID | Age at Death | Sex | Time since Stroke | Ethnicity | Employment Status | Living Arrangements | Marital Status | Other Characteristics |
|---|---|---|---|---|---|---|---|---|
| Chang 2018 | 60-79 | Male$^{n/s}$ | 0-1 year | N/R | N/R | N/R | N/R | |
| Chiu 2020 | N/R | N/R | N/R | N/R | N/R | N/R | N/R | N/R |
| Choi 2019 | 60-74 | Female | 0-1 year | N/R | N/R | N/R | N/R | N/R |
| Cole 2014 | N/R | Male$^{nss}$ | N/R | White$^{nss}$ | N/R | With spouse$^{nss}$ | Married$^{nss}$ | Poor sleep quality |
| Crump 2014 | N/R | Male* | N/R | N/R | N/R | N/R | N/R | N/R |
| Eriksson 2015 | 20-54 | Female | 0-1 year | N/R | N/R | N/R | N/R | Self-poisoning most common method |
| Erlangsen 2010 | >55 | N/R | 0-3 years | N/R | N/R | N/R | N/R | N/R |
| Forsström 2010 | 60-65 mean* | Female* | 0-2 years | N/R | N/R | N/R | N/R | No alcohol influence**<br>Hanging most common method** |
| Hong 2018 | 62$^{n/s}$ | Male$^{n/s}$ | N/R | N/R | Unemployed$^{n/s}$ | N/R | N/R | Religious$^{n/s}$<br>High school or higher$^{n/s}$ |
| Jia 2014 | >65$^{nss}$ | Male$^{n/s}$ | N/R | N/R | N/R | With others$^{n/s}$<br>Head of family$^{n/s}$ | Single$^{nss}$ | Middle school or under$^{nns}$ |

| Study ID | Age at Death | Sex | Time since Stroke | Ethnicity | Employment Status | Living Arrangements | Marital Status | Other Characteristics |
|---|---|---|---|---|---|---|---|---|
| Katayama 2010 | 60-71 | Male | 0-6 months | N/R | Employed | With others | Married | N/R |
| Stenager 1998 | >60* | Female[n/s] | N/R | N/R | N/R | N/R | N/R | N/R |
| Teasdale 2001 | >59* | Male** | 0-5 years | N/R | N/R | N/R | N/R | N/R |
| Waern 2002 | N/R | N/R | N/R | N/R | N/R | N/R | N/R | N/R |
| Webb 2012 | 79[a] | Female* | N/R | N/R | N/R | N/R | N/R | N/R |
| Wu 2018 | >65 | N/R | 0-2 years | N/R | N/R | N/R | N/R | N/R |
| Wyrwa 2021 | 60-69 | Male | N/R | N/R | N/R | N/R | N/R | Higher proportion died by firearm* |
| Yamauchi 2014 | 40-64 | Male | 0-5 years | N/R | N/R | N/R | N/R | Hanging most common method |

*Note.* n/s – higher frequency within suicide after stroke group, but does not reach statistical significance

* $p < 0.05$ ** $p < 0.01$ N/R – not reported [a] median

nss – statistically significant for illness including stroke, but not stroke-specific

**Table 4**

*Clinical Characteristics*

| Study ID | Time in Hospital | Stroke Severity | Stroke Location | Effects of Stroke | Other Health Complications |
|---|---|---|---|---|---|
| Chang 2018 | N/R | Risk increases as number of strokes increase | Ischaemic | N/R | Depression*<br>Coronary disease** |
| Chiu 2020 | N/R | N/R | N/R | N/R | Oophorectomy |
| Choi 2019 | N/R | N/R | Ischaemic* | N/R | Poststroke depression**<br>Pre- and post-stroke depression** |
| Cole 2014 | N/R | N/R | N/R | N/R | Limitations in ADL’s |
| Crump 2014 | N/R | N/R | N/R | N/R | N/R |
| Eriksson 2015 | N/R | N/R | Ischaemic stroke | N/R | Previous stroke<br>Alert on admission |
| Erlangsen 2010 | 2-3 hospital contacts | N/R | N/R | N/R | N/R |
| Forsström 2010 | N/R | N/R | N/R | N/R | Pre-stroke depression = more likely* |

| Study ID | Time in Hospital | Stroke Severity | Stroke Location | Effects of Stroke | Other Health Complications |
|---|---|---|---|---|---|
| Hong 2018 | N/R | Lower in suicide group$^{n/s}$ | Subcortical* and brainstem** ischaemic lesions (large)<br>Anterior circulation$^{n/s}$<br>Left hemisphere$^{n/s}$ | N/R | Diabetes**<br>Post-stroke depression**<br>Hypertension$^{n/s}$<br>Smoking$^{n/s}$<br>Hyperlipidemia$^{n/s}$ |
| Jia 2014 | N/R | N/R | N/R | N/R | N/R |
| Katayama 2010 | < 2 months | N/R | Ischaemic<br>Temporal – parietal cortex<br>Right hemisphere | Residual neurological deficits | N/R |
| Stenager 1998 | N/R | N/R | N/R | N/R | N/R |
| Teasdale 2001 | Less time in hospital** | Less severe | Intracerebral haemorrhage$^{n/s}$ | N/R | Greater change in lifestyle/inability to work likely to have greater impact on younger stroke survivors |
| Waern 2002 | N/R | N/R | N/R | N/R | N/R |
| Webb 2012 | N/R | N/R | N/R | N/R | N/R |

| Study ID | Time in Hospital | Stroke Severity | Stroke Location | Effects of Stroke | Other Health Complications |
|---|---|---|---|---|---|
| Wu 2018 | N/R | N/R | No difference | N/R | N/R |
| Wyrwa 2021 | N/R | N/R | N/R | N/R | N/R |
| Yamauchi 2014 | N/R | N/R | N/R | Physical inability, impairment of social functioning | N/R |

*Note.* n/s – higher frequency within suicide after stroke group, but does not reach statistical significance

* $p < 0.05$ ** $p < 0.01$ N/R – not reported

nss – statistically significant but for illness including stroke, but not stroke-specific

## Synthesis

### *Risk Factors*

Across 15 studies there was evidence that experiencing stroke at a younger age is associated with increased risk of completed suicide. Three studies found that those under 65-years-old were significantly more likely to die by suicide[28,67,69]; two studies found this difference, but it did not reach statistical significance[57,68], and a further four studies did not analyse for significance but reported higher frequency of suicides in younger samples[22,30,66,70].

Half of included studies reported the time between stroke and completed suicide. A higher risk of completed suicide was found within the first two years post-stroke. One study reported a higher frequency of suicides within the first six months after stroke[58]; three found the most at-risk period to be in the first year after stroke[22,62-63]; and two found that the first two years were at-risk periods[67,70]. These studies reported frequencies but not inferential statistics.

Most studies (n=14, 77%) included information on the sex of people who died by suicide. Five of these reported a higher occurrence of completed suicide in women who had a stroke[22,28,60,63,67], and nine studies found men were at higher risk[30,56-58,62,65,68-69,71]. The association between male sex, stroke and completed suicide was demonstrated with nine studies reporting a higher frequency of completed suicide in their male stroke participants; despite most (n=7, 77%) having almost equal percentages of male and female participants. Two of these were deemed to be statistically significant[65,69].

Pre-stroke and post-stroke depression were found to be significantly associated in four studies (22%), across Asian and European communities[62-63,67-68].

### *Possible Risk Factors*

Although only mentioned in two studies[58,68] (11%), there is a suggestion in one study that being employed at time of stroke, compared to being unemployed, increases risk of completed suicide in younger stroke survivors due to the impact of stroke on ability to maintain employment[58].

Other health complications were found to be possible factors for increased risk of completed suicide post-stroke. Diabetes was found to be significantly associated with completed suicide in one study in a cox-regression (HR: 2.64, $p < 0.01$)[68], and coronary disease (aHR: 1.617, $p$=0.002) in another[62].

In a few studies (n=3, 16%) spending less time in hospital after the stroke had occurred was associated with an increased risk of post-stroke suicide[58,66,69]. One of these studies found this to be significant ($W(3) = 29.25$, $p < 0.001$)[69]. Some studies reported method of death (n=5, 28%), with more violent methods, such as hanging and use of firearms, reported in just over half of post-stroke suicides (n=3, 60%)[30,67,71] and other deaths were caused by self-poisoning with medication overdoses[22,62].

The type of stroke could be a risk factor for completed suicide post-stroke. Ischaemic strokes were reported to be associated with higher risk in five studies (28%)[22,58,62-63,68], with two being statistically significant[63,68]. Although one study[69] reported patients with haemorrhagic stroke to have a higher frequency of completed suicide than people with ischaemic stroke, this difference was not statistically significant.

### ***Unreported Data***

There were large discrepancies in the quality and amount of data reported across the studies. Marital status[56-58], length of time spent in hospital[58,66,69], living arrangements[56-58], and location of the stroke[58,68,69] were only reported in three of the studies included in the synthesis (16%); employment status[58,68], stroke severity[68-69], effects following the stroke[30,58], and other potential participant characteristics (such as education level[57,68]) were only reported in two studies (11%). Other clinical information regarding participants were rarely recorded, and only one study (5%) reported participant ethnicity[56].

## Discussion

This is the first systematic review to synthesize evidence on risk factors associated with completed suicide after stroke. It is important to review this evidence to identify differences in risk factors for suicidal ideation versus completed suicide after stroke, enabling development of more targeted prevention and intervention strategies.

Eight risk factors were found for completed suicide post-stroke: under 65-years-old, within two years of stroke, male, employed at time of stroke, additional health complications, shorter duration of hospital stay initially following stroke, pre- and post-stroke depression, and ischaemic strokes. A further seven characteristics were identified that did not yield enough data to draw firm conclusions: marital status, living arrangements, location of stroke, stroke severity, impact of stroke, education level and ethnicity.

This is the first review to focus solely on completed suicide post-stroke, extending research into an under-researched field within stroke. Completed suicide post-stroke has been consistently less researched compared to post-stroke depression and suicidal ideation[23-24,48,72-74]. A key strength of this review is that it highlights a striking underreporting of ethnicity within stroke research. Additionally, the search strategy was developed in consultation with a specialist librarian and the multiple databases searched identified a dataset from multiple countries and cultures. PRISMA guidelines were followed, and a second rater independently checked 20% of a random sample of the included studies throughout the process.

A variable identified within our study that is consistent with wider literature is employment. One study[58] in our review suggested that being employed at time of stroke and unable to maintain this employment, increases risk of completed suicide in stroke survivors. The proportion of stroke survivors who return to work in the wider literature ranges from 11–85% depending on definitions of stroke and work, study samples and follow up periods[75]. The wider literature suggests that there is an increasing incidence of stroke in people of a working-age[76-78], and a large proportion of stroke survivors who were employed at the time of their stroke either could not return to work (average 40%[79]) or had to reduce their work hours, leading to greater lost productivity and meaning[10]. Our findings are therefore consistent with previous research on suicide risk factors in the general population, in which unemployment posed an increased risk of suicide[41,80-81] due to lost meaning and occupation. However, due to the small number of studies within our synthesis that included employment status data, the relationship between stroke, employment, and suicide requires further research.

Comparing our findings to previous reviews of suicidal ideation highlights differences in our results. The current review found that men were at higher risk of completed suicide post-stroke. This differs from previous research which suggests females are more at risk[7]. This may be due to the exclusive focus on completed suicide. Greater risk of completed suicide for men reflects research on suicidal ideation and completed suicide in the general population, in which females are more likely to report suicidal thoughts and attempts and men are more likely to die by suicide[39,82]. This may additionally explain why more studies in this review reported more violent methods of death, as males often use violent methods of suicide regardless of stroke status[83-85].

Another difference to previous reviews is age. Our findings for age were inconsistent with previous reviews, such as Zhang et al.’s (2022)[23] meta-analysis of suicidal ideation post-stroke. Zhang et al. determined that older age was associated with higher risk of suicidal ideation; however, this is inconsistent with other reviews of suicidal ideation and completed suicide[,7,10,86]. The current systematic review found that being under 65-years-old was more strongly associated with completed suicide than being older than 65 years.

A strength of the current review is the inclusion of both demographic and clinical characteristics as risk factors for completed suicide. There is still little known about the influence of stroke location and type on risk of suicidality and completed suicide post-stroke. The current review suggests that ischaemic strokes may present a higher risk of completed suicide; however, it is important to note that this is based on raw data, therefore the finding may be due to ischaemic strokes being more common[1]. Previous research indicates similar risk in both ischaemic and haemorrhagic strokes[21-22], and some research suggests left hemisphere strokes present a higher risk[68,87], though this may reflect better recognition and reporting of left hemisphere strokes[88-89] and requires further research.

Notably, only one study reported ethnicity. A key strength of this review is the consideration of ethnicity as a possible risk factor. Previous reviews which consider completed suicide post-stroke do not report ethnicity as part of their review[7,10,48], despite it being well evidenced that minority populations are more likely to experience a stroke; with black and South Asian populations up to twice as likely to have a stroke[90-91]. It is also reported that minority populations have strokes at a younger age[92], which the current findings suggest places them at a higher risk of post-stroke suicidal death. There are insufficient data collected as part of death registration processes to determine ethnic groups at a higher risk of suicide regardless of stroke status[93], however minority populations experience more negative social conditions that may place them at higher risk of suicide[94]. Minority ethnic groups are also less likely to receive specialist assessment by mental health services in the general population[93] and are documented as having poorer access to best practice stroke care and interventions[95]. The combination of these factors within the context of increased likelihood of stroke is striking. It is vital that research better explores relationships between ethnicity and completed suicide post-stroke.

The systematic review is subject to limitations, however. Firstly, the large discrepancies in the quality and amount of data reported across the studies, especially demographic data, made it challenging to provide more conclusive information on risk factors for post-stroke completed suicide. Similarly, studies differed according to whether they reported raw data, death rates, or odds ratios. This made determining associations with completed suicide difficult and limited the ability to draw comparisons between studies. Additionally, although the NOS is the most recommended tool for use in cohort and case control studies, it is not without its limitations. The tool does not consider issues of power; a few studies appeared to be underpowered and had considerable discrepancies in sample size for people who died by suicide and those who did not, which were not considered. Finally, having two independent reviewers to complete screening, extraction and quality assessment of all studies was beyond the remit of the current review.

## Implications and Recommendations

The review has implications for improving stroke and suicide care and research. Clinically, the review will support clinicians caring for stroke survivors to consider potential risk factors for completed suicide post-stroke when completing mood and suicide screening, risk assessment, and formulation of risk in line with NICE guidelines[96]. Regarding research, steps should be taken by researchers to ensure as much demographic and clinical data as possible are reported to allow for better comparisons, synthesising and understanding to support the development of more detailed risk factors. This review highlights the need for a focused approach to future research that will provide more consistent data collection across studies. There remain unanswered questions around clinical and demographic characteristics, such as ethnicity, living arrangements, and type of stroke. To better support clinical risk assessments, more information regarding participants’ demographic and clinical characteristics is required to get a more detailed understanding of those who are most at risk, therefore it is recommended that these be clearly reported in research studies.

In conclusion, there are several factors associated with completed suicide post-stroke, including: under 65-years-old at time of stroke; age under 65-years-old, occurrence within two years of stroke, male gender, employment at the time of stroke, shorter hospital admission, pre- and post-stroke depression, and ischaemic stroke. The studies included within the review varied considerably in terms of quality and quantity of data, including regarding participant and clinical characteristics, which limited the extent to which risk factors could be compared between studies and determined. It is recommended that future research retrieve and report as much demographic and clinical information as possible to determine groups at higher risk.

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# Chapter 3 – Empirical Study

## Increasing Intention to Screen Suicidality in People with Post-Stroke Aphasia: An Online Vignette Study of Speech and Language Therapists in the UK and Australia

# Increasing Intention to Screen Suicidality in People with Post-Stroke Aphasia: An Online Vignette Study of Speech and Language Therapists in the UK and Australia

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# Abstract

**Background:** Stroke is associated with increased suicidality risk (Vyas et al., 2021) and post-stroke aphasia may increase this further (Perrotta, 2020). Previous research found that staff had lower intention to screen for suicidality in people with aphasia (PwA). Intention to screen mood was predicted, in part, by normative beliefs (Schlesinger et al., 2023). We aimed to test if communicating the normative belief that stroke professionals are expected to screen suicidality in PwA increased staff intention to do so, focusing on Speech and Language Therapists (SLTs).

**Methods:** A randomized, experimental study was conducted with 86 SLTs in the UK and Australia. They were asked to rate intention to screen PwA for suicidality, before and after reading a randomly selected vignette of working in a team with a normative belief about screening for either suicidality or aspiration. Qualitative responses were also collected to gather additional context and information.

**Results:** Non-parametric testing found a significant difference between pre- and post- intention to screen for suicidality in both the UK (T = 4.089, p < .001, *r* = 0.58) and Australian (T = 3.645, p < .001, *r* = 0.60) participants. Further analysis found a significant difference between the post-vignette suicidality screening scores of the Test and Control group in the UK sample (U = 173.5, Z = -2.521, *p* = .012, *r* = 0.36). Qualitative analysis highlighted three main categories of barriers to conducting screening: competence, confidence, and role expectations, as well as four factors which would facilitate an increase in screening: training, clear expectations, resources, and additional support for professionals and patients.

**Conclusions:** Communicating a normative belief that staff are expected to screen suicidality in PwA increased SLTs intention to do so. SLTs reported that barriers to screening are feeling lacking in training, competence, and confidence to complete suicidality screening in PwA. Clarity in professional roles and expectations, additional training and resources, and further support would facilitate an increase in suicidality screening.

**Keywords**: post-stroke suicidality, screening, aphasia, normative beliefs

## Introduction

Stroke is the third-leading cause of disability and death worldwide (Feigin et al., 2022), with the UK having approximately 1.3 million stroke survivors (Stroke Association, 2020). Stroke can result in changes to cognition, emotions, and behaviour, which can impact day-to-day life and lead to a greater reliance on others to support everyday activities of daily living (Intercollegiate Stroke Working Party [ISWP], 2023). This research focused on aphasia, suicidality, and staff intention to screen for suicidality in people with post-stroke aphasia (PwA) and how to increase this. The current study focuses on the UK and Australia, to explore whether screening rates and response to an intervention to increase these were similar across countries and healthcare contexts. Australia was chosen as a forerunner in stroke and aphasia healthcare, with dedicated aphasia research and rehabilitation centres in Queensland and Victoria.

Suicidality refers to a range of behaviours that pose the risk of killing oneself; including thoughts of suicide, the presence of a suicidal plan, or having intent to end one’s life (Posner et al., 2014). Research suggests that stroke survivors experience suicidal ideation at double the rate of the general population, with depression being a leading contributor to this (Santos et al., 2012). A recent systematic review found stroke survivors to be up to 73% higher risk for attempted suicide, and 61% higher risk for completed suicide than a non-stroke population (Vyas et al., 2021). Post-stroke aphasia presents a greater risk of developing depression than those without aphasia (Hilari, 2011; Kauhanen et al., 2000) therefore, it has been suggested that post-stroke aphasia may further increase suicide risk (Perrotta, 2020). The detection and treatment of psychological distress should form an important aspect of aphasia rehabilitation and research, however PwA are often excluded from research on post-stroke depression (Brady et al., 2013; Schlesinger et al., 2021).

One in four stroke survivors are living with aphasia (Stroke Association, 2021). Despite being a common consequence of stroke, research suggests healthcare professionals are unlikely to have received specific training in communicating with PwA (Burns et al., 2012; Finke et al., 2008). This leads to concerns within healthcare that people with communication difficulties may receive poorer care from services due to unskilled communication, inaccessible information, and adverse staff attitudes (O'Halloran et al., 2008).

Carota et al. (2016) recommend completing a suicide risk assessment in PwA. However, Hart and Morris (2008) argue that adherence to routine screening is limited by time pressures, lack of perceived control, and poor awareness of guidelines. Specific tools for the assessment of mood in PwA have been developed (Barrows & Thomas, 2018; Benaim et al., 2004; Lincoln et al., 2000; Stern et al., 1997; Turner-Stokes et al., 2005), but a systematic review of their reliability, validity and feasibility concluded that none were sufficiently investigated and most were of low methodological quality (van Dijk et al., 2016). Further, many of these measures do not include questions on suicidality and therefore may not detect risk. Hackett et al. (2010) found that suicidality may be missed on standard screening measures for depression and may not be detected unless specifically and sensitively asked about.

Research on suicide screening and risk assessment suggests that the factors influencing staff intention to screen are multifaceted; including confidence, self-efficacy, negative attitudes towards mental health, and beliefs about with whom responsibility to complete screening lies (Boukouvalas et al., 2020; Heyland et al., 2018). Psychologists play a central role in suicide prevention due to having more mental health training than other stroke professionals (Sommers-Flanagan & Shaw, 2017) and feeling more confident and skilled in this area (Erps et al., 2020). However, research has found that some clinical psychologists report feeling inexperienced in managing communication in aphasia, and thus uncomfortable with providing effective psychological support and treatment. This can result in a lack of accessibility to services for PwA (Baker et al., 2018) which may influence the likelihood that they are screened for suicide risk compared to the general population.

Research on post-stroke suicidality, and specifically in PwA, is important given a quarter of stroke survivors develop aphasia (Stroke Association, 2021) and stroke survivors are up to 61% more likely to die by suicide than a non-stroke population (Vyas et al., 2021), with this suggested to be greater in PwA due to the increased vulnerability to depression than stroke alone (Hilari, 2011; Kauhanen et al., 2000; Perrotta, 2020). Clinical guidelines recommend completing psychosocial assessments with all stroke survivors, including asking about suicidality (Duncan et al., 2005; Miller et al., 2010), and screening for suicidality in people with suicide risk factors (Canadian Coalition for Seniors' Mental Health, 2006; Her Majesties Government Department of Health, 2012), which include stroke (Bartoli et al., 2017; Vyas et al., 2021). Recent UK stroke guidelines also recommend assessment of suicidality (ISWP, 2023; National Institute for Health and Care Excellence [NICE], 2023). Previous research, however, suggests screening mood and suicidality is still uncommon (Hart & Morris, 2008; Lees et al., 2014; Schlesinger et al., 2023).

One lens through which screening behaviours can be understood is the Theory of Planned Behaviour (TPB). The TPB model (Ajzen, 1985) is one of the most frequently cited models for the prediction of health-related behaviour (Ajzen, 2011). The model suggests there is a relationship between attitudes, normative beliefs and perceived behavioural control which shapes an individual's behavioural intentions and behaviour. Several studies have reported that the TPB successfully predicts health-related behavioural intentions and behaviours (Godin & Kok, 1996; Hagger et al., 2002; Sheeran & Taylor, 1999). Importantly, there is developing literature within the field of stroke rehabilitation utilising the TPB model. Findings suggest it has been successfully applied in studies of staff intentions and behaviours within stroke services (Ab Malik et al., 2018; Tambi et al., 2019), including screening for low mood (Hart & Morris, 2008) and providing non-pharmacological interventions in emotionalism (Gillespie et al., 2020), which find normative beliefs as the strongest predictor of behavioural intention.

Schlesinger et al. (2023) examined the extent to which TPB principles account for staff intentions to screen mood in PwA, finding TPB variables accounted for 48% of variance in intention to screen for depression by stroke professionals, with normative beliefs about screening mood a significant predictor of intention to screen mood. The research highlighted a discrepancy between the intention to screen for low mood and suicidality; with Speech and Language Therapists (SLTs) being one of the professional groups in which this discrepancy was most evident, as they reported a modal intention of 100% to screen for low mood but 0% to screen for suicidality. The authors recommended clear normative expectations be communicated to stroke professionals regarding the expectancy to screen all stroke survivors for low mood and suicidality.

The recently updated UK national clinical guideline for stroke (ISWP, 2023) recommends that screening for mood difficulties occurs within six weeks of stroke. However, the 2021 Sentinel Stroke National Audit Programme (ISWP, 2022) identified that only 9% of acute stroke services in the UK have appropriate access to clinical psychology, and over a third of rehabilitation teams do not have clinical psychology support (ISWP, 2021). Similarly, the 2020/21 National Stroke Audit in Australia showed that approximately two-thirds of acute stroke services do not have active psychology support, with patients rarely assessed by a psychologist during acute admissions (Stroke Foundation, 2021). Within rehabilitation services in Australia, there are also significant gaps in ensuring specialist management is provided by psychological services, as 32% of services report no access to psychology colleagues, despite 44% of patients indicating a mood impairment (Stroke Foundation, 2020). Across health systems it is therefore important to understand how other professional groups, particularly SLTs, can detect suicidality as there are not enough psychologists to do so.

The current research used an experimental design to test the prediction that intention to screen PwA for suicidality can be influenced by normative beliefs. The current research focused on SLTs, as they are the most likely professional group to work with PwA (Stroke Association, 2021), in both the UK and Australia.

The following research questions guided this study: 1) Does establishing a normative belief that stroke professionals should screen for suicidality in PwA, increase intention to carry out this screening? and 2) Are there additional factors which influence intention to screen? Additionally, to characterise the sample we addressed the following research questions: 3) Do SLTs report having relevant Continuing Professional Development (e.g., attendance of training on screening for suicidality, reading relevant clinical guidelines on suicidality and on aphasia)? and 4) Do SLTs report screening for suicidality in PwA as part of their work?

## Method

### Design

An online experiment with a mixed factorial design was conducted, using a vignette about working with a PwA in distress in a fictional stroke service with two between-group factors: condition (Test vs Control) and country of residence (UK vs Australia), and one within-group factor: time (pre- vs post-vignette). Vignettes have been successfully used in previous research, including stroke research (Carin-Levy et al., 2021; Geraghty et al., 2020).

Participants were randomly allocated to receive information indicating clear expectations (normative beliefs) that stroke professionals should screen suicidality in all stroke survivors including PwA (Test group) or matched information about screening for dysphagia, without indication of expectations about suicidality screening (Control group). Participants rated their intention to screen for suicidality as a percentage before and after reading the vignette. Both this scale format and additional data collection procedures to characterise participants were drawn from a previous study by Schlesinger et al. (2023).

### Participants

Participants were UK- or Australian-based SLTs working with PwA, including students and qualified staff. SLTs working in a service, or in a capacity, that prevented them from working with PwA, or outside the UK or Australia, were excluded.

Eighty-six SLTs working with PwA post-stroke completed the online experiment. This included 49 UK SLTs and 37 Australian SLTs from a range of acute and community services. Table 1 summarises the demographic details of the sample, including their country of work, length of clinical service, and clinical setting.

**Table 1**

*Sample Demographics*

| | UK (N =49) | | Australia (N = 37) | |
|---|---|---|---|---|
| | N | (%) | N | (%) |
| *Length of Time as SLT* | | | | |
| Student | 2 | (4) | 10 | (27) |
| 0-5 years | 17 | (35) | 10 | (27) |
| 6-10 years | 10 | (20) | 17 | (46) |
| More than 10 years | 20 | (41) | 0 | (0) |
| *Length of Time Working with PwA* | | | | |
| Student | 2 | (4) | 14 | (38) |
| 0-5 years | 20 | (41) | 6 | (16) |
| 6-10 years | 10 | (20) | 17 | (46) |
| More than 10 years | 17 | (35) | 0 | (0) |
| *Clinical Setting* | | | | |

| | UK<br>(N =49) | | Australia<br>(N = 37) | |
|---|---|---|---|---|
| | N | (%) | N | (%) |
| Hospital Stroke Unit | 16 | (34) | 10 | (27) |
| Community Stroke Service | 8 | (16) | 1 | (3) |
| Hospital Neurorehabilitation Ward | 7 | (14) | 7 | (19) |
| Community Neurorehabilitation Service | 6 | (12) | 4 | (11) |
| Hospital Ward (General) | 5 | (10) | 4 | (11) |
| Early Supported Discharge | 3 | (6) | 2 | (5) |
| Private Practice | 2 | (4) | 3 | (8) |
| Community Health Service | 0 | (0) | 4 | (11) |
| Residential Home | 0 | (0) | 1 | (3) |
| Hospital Geriatric Rehabilitation | 0 | (0) | 1 | (3) |
| Hospital Outpatient Service | 1 | (2) | 0 | (0) |
| University Aphasia Centre | 1 | (2) | 0 | (0) |

Initial data suggested a total of 215 participants; however, 129 of these did not complete the questionnaire, and therefore could not be included in the final analysis. Demographic information on these participants is not available as it was not provided by those who dropped out and did not complete the experiment (see Appendix F for a summary of attrition points).

## Measures

This research used Schlesinger et al.’s (2023) survey methodology with permission (Appendix G) to gather information on screening behaviours and staff training. The Schlesinger survey was developed collaboratively with clinical neuropsychologists, an SLT with experience in stroke and aphasia, and experts in questionnaire design and statistics. The survey comprises sections on demographic data, screening behaviours, knowledge, training, and TPB principles using visual analogue scales which consisted of a line anchored at either end by the extremes of the TPB variable being measured. Visual analogue scales are psychometric response scales used to measure subjective characteristics or attitudes and are valid for use in social science research (Svensson, 2000; van Dijk et al., 2002; Wewers & Lowe, 1990). After any required reverse scoring, the number the respondents answer fell on was used for analysis. Open text response data gathered further information regarding reasons for answers on the survey questions (Appendix H).

### ***Vignettes***

Case vignettes have been used within psychological research as a way of manipulating information, including in PTSD (Dorahy et al., 2017; Hundt et al., 2016), criminal justice issues (Guy & Edens, 2006; Krauss & Sales, 2001; Neal et al., 2012) and stroke (Carin-Levy et al., 2021; Geraghty et al., 2020). Case vignettes have also been used within TPB research (Green et al., 2008; Schomerus et al., 2009) .

The vignettes used in the current study (Appendix I) were based on clinical presentations of suicidality, ensuring they encapsulated a necessary degree of distress to permit consideration of suicidality screening. Both groups received a vignette that followed the same structure and were identical apart from the manipulation (suicidality vs dysphagia). The structure of the vignettes included information about a fictional service and its priorities, expectations of team members including the normative belief, and a fictional clinical session and client. The Control group vignette normative belief was based on expectations of staff to identify aspiration pneumonia and swallowing needs in the stroke context, while the normative belief in the Test group vignette referred to expectations to screen for suicidality and emotional needs in the stroke context.

The vignettes were developed with support from clinical neuropsychologists, clinical psychologists and SLTs working within stroke and aphasia who reviewed the vignettes and provided input on their wording and structure. Feedback was also gathered on the accuracy with which the vignettes developed the desired normative belief, the importance placed on this belief by important others (in this case, a fictional stroke team), and how apparent the normative belief was. Further, an anonymous survey was sent to first- and second-year Trainee Clinical Psychologists (TCPs) at the University of East Anglia to pilot the vignette. The decision was made to conduct the pilot with TCPs to ensure the potential recruitment pool of SLTs was not impacted by seeing vignettes prior to study participation.

## Ethics

Ethical approval (Appendix J) was received from the University of East Anglia (UEA) Faculty of Medicine and Health Sciences Research Ethics Committee [Approval number ETH2223-0059]. In order to gain access to the survey, participants read an electronic participant information sheet (Appendix K) and completed an online consent form (Appendix L). The survey was designed to maintain anonymity of participants. Participants received an electronic debrief sheet (Appendix M) following completion of the study. Data was stored in accordance with the General Data Protection Regulation and UEA policy.

## Procedure

Participants were recruited via an online snowballing campaign using three main routes: social media advertisements (e.g., via Twitter, Facebook, LinkedIn); contact by relevant UK- and Australian-based professional bodies and special interest groups to consenting members via email or social media (e.g., Royal College of Speech and Language Therapy and Speech Pathology Australia); and word-of-mouth advertising, by asking participants to inform colleagues about the survey.

Participants were provided with a link to access the correct survey dependent on country of residence via social media or email. After being provided with an information sheet and consent form, they were asked to complete demographic information and the visual analogue scales (including intention to screen for suicidality) before reading the vignette, after which they were asked to complete the visual analogue scale again and respond to free-text questions. Participants were unable to access the survey without signing the consent form.

The online survey platform PsyToolKit (Stoet, 2010, 2017) was used to present the study (see Additional Methodology chapter for greater detail on questionnaire creation via this platform). Steps were taken to minimise missing data, by making each question mandatory thereby not allowing participants to continue the survey unless each question had been completed.

## Analysis

### *Statistical Analysis*

Descriptive statistics were calculated for demographic information, screening behaviours, and levels of knowledge and training. The data were split by country for all analyses to examine whether results differed between the UK and Australia. All statistical assumptions were checked before analysis, and nonparametric analyses were conducted due to non-normal data showing asymmetry and high levels of skewness. Following consultation with a statistician to ensure the most appropriate testing was conducted, Mann-Whitney U tests were used to analyse between-group differences, and Wilcoxon Signed Rank Tests were used to analyse within-group differences in screening intention before and after reading the vignette.

### *Qualitative Analysis*

Free text questions were analysed using content analysis. This was deemed the most appropriate analytic methodology due to the short, written responses obtained with questionnaires. The content analysis followed the process and stages set out by Mayring (2021), utilising an inductive category formation approach. This involves defining category definitions and level of abstraction in advance, to identify the relevant parts of the text. In this instance, these were based on additional factors known to influence suicidality screening (confidence, training, knowledge) as well as general TPB principles (normative beliefs, attitudes, and perceived behavioural control). It was decided that these categories were sufficiently broad so as to not miss important details in the initial phase. As the text was coded (see Appendix N for an example), these categories were more specifically defined until main categories were developed and interpretations could begin. As the data consists of subjective opinions, creating categories and conceptions using this approach provided an authentic description that reflected the participants reasoning without preconceptions of the researcher (Mayring, 2010).

## Results

### Normative Beliefs

Following statistical advice, non-parametric tests were used as the data did not meet parametric assumptions. The data showed a strong positive skew that could not be corrected with transformations, therefore statisticians advised that, although a less powerful and efficient analysis, the level of skew required the use of non-parametric analyses. As a result, Mann-Whitney U and Wilcoxon-Signed Rank tests were determined to be the most appropriate.

Wilcoxon-Signed Rank tests indicated significant increases in reported intention to screen for suicidality after reading the vignettes for the Test and Control groups, in participants in the UK and Australia (Table 2). In other words, participants in both countries shown a significant increase in their intention to screen for suicidality across time points (pre- and-post vignette). Mann-Whitney U tests (Table 3) indicated there was a significant difference between the post-vignette suicidality screening scores of the Test and Control group in the UK sample in the expected direction. However, the post-vignette difference in Australian Test and Control groups was non-significant. Thus, making an expectation to screen for suicidality clear to participants resulted in a significantly different increase in intention to screen for participants in the UK, but not Australia.

**Table 2**

*Summary of Pre- and Post-Vignette Intention to Screen*

| | Pre-Vignette | | Post-Vignette | | T | Z | *p* | *r* |
|---|---|---|---|---|---|---|---|---|
| | *Mdn* | (IQR) | *Mdn* | IQR | | | | |
| UK | 15 | (59.5) | 59 | (49.5) | 778.5 | 4.09 | <.001 | 0.41 |
| Australia | 9 | (50) | 68 | (68) | 484.5 | 3.65 | <.001 | 0.42 |

**Table 3**

*Summary of Difference Between Groups on Post-Vignette Intention to Screen*

| | Group | *Mdn* (IQR) | *N* | U | Z | *p* | *r* |
|---|---|---|---|---|---|---|---|
| UK | Test | 73 (41) | 23 | 173.5 | -2.52 | .012 | 0.36 |
| | Control | 48.50 (58.75) | 26 | | | | |
| Australia | Test | 61.50 (66.50) | 20 | 154 | -0.49 | 0.625 | 0.08 |
| | Control | 72 (77) | 17 | | | | |

## Screening Rates and Approaches

Respondents reported that more PwA within their service receive mood screenings than suicidality screens (Table 4). The modal responses for likelihood that PwA would be screened in their service at baseline reported by SLTs was 100% for low mood, but 0% for suicidality. When SLTs rated their own intention to screen PwA for suicidality at baseline, the modal response reported was also 0%. The large standard deviations highlight significant variability in responses.

**Table 4**

*Likelihood and Intention of Mood and Suicidality Screen at Baseline*

| | UK | | | Australia | | |
|---|---|---|---|---|---|---|
| | *Mdn* | (IQR) | Mode | *Mdn* | (IQR) | Mode |
| *Usual Service* | | | | | | |
| Likelihood to Screen for Low Mood | 65 | 80 | 100 | 20 | 80.5 | 100 |
| Likelihood to Screen for Suicidality | 20 | 58 | 0 | 1 | 16 | 0 |
| *Individual* | | | | | | |
| Intention to Screen for Suicidality | 15 | 59.50 | 0 | 9 | 50 | 0 |

There was variation in the professional groups reported as most likely to screen for mood and suicidality within services. Most respondents reported SLTs (n=38), occupational therapists (n=33), and psychologists (n=32) to be completing the screening within their service, whereas fewer reported clinical neuropsychologists (n=25), nurses (n=20), physiotherapists (n=20), and medical consultants (n=20). Similarly, there was variation in the methods used to screen for low mood and suicidality with PwA. The most common method reported was clinical interviews with patients (n=45) and with family or carers (n=27), but a high proportion of respondents reported that no screening method was used (n=30).

## Level of Training and Awareness of Guidelines

Table 5 summarises participant levels of training and awareness of guidelines. All respondents reported receiving training on aphasia and supported communication training for PwA. A third of participants' workplace had specific suicide prevention guidelines, or were aware of these, but less than a fifth had received training on suicide or suicidality screening. The majority of participants were aware of official guidelines for aphasia, but less than half were aware of guidelines for depression and knowledge of research on suicide in PwA. Participants were asked to rate their level of confidence in completing suicidality screening with PwA; a fifth of participants recorded the maximum score for 'unconfident', on a scale of 0 for 'confident' to 100 for 'unconfident' (*Mdn* = 65.5, IQR = 56.5).

**Table 5**

*Awareness of Guidelines / Policies and Level of Training*

| | UK | | Australia | |
|---|---|---|---|---|
| | *N* | (%) | *N* | (%) |
| *Aphasia Training* | | | | |
| Yes | 49 | (100) | 37 | (100) |
| No | 0 | (0) | 0 | (0) |
| *Supported Communication with PwA Training* | | | | |

| | UK | | Australia | |
|---|---|---|---|---|
| | *N* | (%) | *N* | (%) |
| Yes | 49 | (100) | 37 | (100) |
| No | 0 | (0) | 0 | (0) |
| *Workplace Suicide Prevention Policies* | | | | |
| Yes | 16 | (33) | 16 | (43) |
| No | 33 | (67) | 21 | (57) |
| *Suicide Training* | | | | |
| Yes | 10 | (20) | 9 | (24) |
| No | 39 | (80) | 28 | (76) |
| *Training in Suicide Screening* | | | | |
| Yes | 7 | (14) | 5 | (14) |
| No | 42 | (86) | 32 | (86) |
| *Awareness of Prevalence of Suicide / Aphasia* | | | | |
| Yes | 21 | (43) | 19 | (51) |
| No | 28 | (57) | 18 | (49) |
| *Awareness of Clinical Guidelines for Depression* | | | | |
| Yes | 27 | (55) | 10 | (27) |
| No | 22 | (45) | 27 | (73) |
| *Awareness of Clinical Guidelines for Aphasia* | | | | |
| Yes | 41 | (84) | 36 | (97) |
| No | 8 | (16) | 1 | (3) |

## Qualitative Analysis

The qualitative content analysis revealed four main categories, which were confidence, competence, role expectations, and facilitators. A further twelve subcategories were developed (Table 6).

**Table 6**

*Overview of the Categories Developed Through the Content Analysis*

| Main Categories | Subcategories |
|---|---|
| Confidence | Confident in depression, not suicidality (n = 21) |
| | Training = confidence (n = 35) |
| | Follow up support (n = 19) |
| Competence | Access to tools / resources (n = 40) |
| | Training on how / when (n = 36) |
| | Time pressures (UK) (n = 4) |
| Role Expectations | Policies / team expectations (n = 30) |
| | “Not my job” (n = 38) |
| Facilitators | Training (n = 50) |
| | Expectations (n = 37) |
| | Resources (n = 49) |
| | Further support (n = 22) |

### *Confidence*

A common theme amongst participants in both countries and groups was that they felt confident in screening for depression in PwA, but not suicidality, for example “I would be more likely to explore low in mood rather than suicidality as I have never completed conversations/had training re: suicidality" and "I would be unsure how to screen specifically for suicidality but could screen for depression due to lack of training/confidence".

This seemed to be related to the experiences they have had within services, as some participants commented that their current service screens everybody as part of their admissions process and therefore, they felt more confident to do this when asked regarding the vignette. For example, "Screening mood is part of admissions process for all stroke clients in my service, however risk assessment and management is important ongoing. I would informally screen for mood and within that ask about self harm/suicidality". There appeared to be a clear link between training and confidence, as participants commented how if they had received training on how to screen for suicidality, they would feel more confident in doing so: "I would like to be able to, but I have not received any training on how to do this, therefore would not be qualified or confident to".

Many participants stated that it is their confidence in managing suicidal clients that inhibits them from screening for suicide. They refer to not being trained in offering therapeutic support outside of improving their speech and language abilities, therefore prevents them from discussing it in the first place, such as "SLTs are not trained to counsel people and are supposed to refer onwards if any". Further, a lack of psychological provision within stroke services, and available support for PwA in mainstream services, limits the options available to SLTs to refer to: "I know it would be good practice, but it feels unhelpful locally as none of the mental health services feel able to work with people with significant communication difficulties and our team have recently stopped providing formal psychological support".

### ***Competence***

Participants named a lack of training as a factor which hinders their competence to complete screening. Many participants commented not knowing at which point in the stroke pathway to undertake screening, or when to do it if concerns arise. Similarly, some participants demonstrated a misunderstanding of suicidality, as they expressed concerns screening for suicide would increase risk, for example “Screening for suicidality may trigger the person deeper into depression/begin suicidal ideations that may not have been there”. Those participants who had previously received training on suicidality screening conveyed a greater competence and willingness to do this, such as “I am trained in my place of work to screen for suicide risk and there are guidelines about when this should be completed. I also have the skills to do this in a supported way for people with aphasia”.

For many participants across both countries, a lack of available and appropriate tools to screen for suicidality was a barrier to completing screening. The majority of participants appeared to understand screening as something that had to be done using a standardised measure/resource, and therefore required knowledge of what one would be best, such as “don’t know what tools to use or how to” and “I would have no idea about what screening tools to use initially and then how I would support the person, based on their score”. One participant commented “I am not sure whether having a conversation with the patient is classified 'screening'”.

Additionally, within the UK, the current pressures within healthcare lead participants to feel unable to undertake screening. The increased demands placed on staff, as well as the difficult retention of staff across services, meant that screening is often not a priority for participants in the wider context of their work. For example, “speech therapy is currently extremely limited - difficult to know how to prioritise time”.

### ***Role Expectations***

A prominent theme throughout both countries related to job roles. Participants frequently referred to screening for suicidality as not being part of the job for SLTs and therefore, not their responsibility, for example “I think this person requires screening for suicidality, but that is not my job role and instead should be completed by a stroke neuro/psychologist" and "it's not usually part of scope for SLTs within Australia in the setting I work in". Some participants acknowledged the interplay between job role and competence; recognising there are other members of their team who would be better equipped to undertake this screening, such as "I think that a clinical psychologist would be more accessible and better skilled at completely this assessment than myself. Given they are available then I would use them". However, some also reflected on the difficulty that arises when access to psychology is not available, which may lead to screening behaviours being more within the SLT remit, for example "other teams do not have access to clinical psychology so it is important the speech pathologist is skilled in managing patients presenting with depression and or suicidality".

Many participants within the Test group made reference to the normative belief within the vignette as a factor which influenced their intention to screen for suicidality. Although some still acknowledged barriers regarding job roles, the expectation set out by teams appeared to override this, such as "I don't feel that it is within my scope of practice to be screening suicidality. but it is part of expected job role - as per interview" and "screening is part of the team culture. I could be in trouble if I didn't follow the policy of the team to do the screening". Some participants referred to feeling more supported to undergo this training, regardless of 'traditional' role expectations as it had been explicitly referred to by senior members of the team within the vignette, "so I had an understanding of expectations of my role and support that it was absolutely valid time was spent to screen for suicidality as important part of my SLT role/remit". Finally, one participant commented "this survey itself which has focused me to think more about suicidality" despite being in the Control group, and therefore influenced their decision making.

### *Facilitators*

A common theme amongst participants was that the barriers to screening also acted as possible facilitators to screening. Many referred to additional training on recognising suicidality and screening for suicidality, including when and the types of questions to ask, would improve both their competence and confidence in doing so. Moreover, increasing their knowledge of possible tools or resources to use to facilitate these conversations would increase their intention of doing so, for example “training, implementing screening into routine practice with use of a validated tool/s and guidance regarding when to complete these (e.g., on admission, at certain points within patient's stay, when should screening be repeated/indicators for this)” and “further training and an easy quickly accessible screen/assessment”.

Expectations within teams were identified as a factor that could facilitate screening behaviours. Participants referred to knowing who was expected to undertake what duties and standards to which they were aware of would support them to feel more comfortable in screening, for example “training, guidelines/pathways/standards with clear role delineation and expectations”. Knowing that their services had agreed on a way in which to manage and support clients who may be struggling with their mood or suicidality felt important to others, such as “team agreed protocol in managing signs of low mood and depression”.

For some participants, they felt that their role as a professional within healthcare made it their duty to complete this screening regardless of their specific role, such as “better training and understanding of duty of care- it's your role as a health professional full stop - it's only a screen and there are crisis teams/psych/GPS who can take it from there”. However, many referred to increasing knowledge on services that can further support clients if they are suicidal, and needing to be able to access these in order for them to feel more able to begin screening, for example “there also needs to be services to support if the person does admit suicidal thoughts and this may be a worry for health professionals to unearth, if services are limited in their area”.

## Discussion

This is the first experimental TPB study within stroke, and the first to examine the impact of normative beliefs on increasing intention to screen for suicidality using an experimental case vignette methodology. This study replicated the findings regarding initial intention to screen set out by Schlesinger et al. (2023), but extended this to another country and testing Schlesinger et al.'s prediction that communicating a clear normative belief about screening would increase intention to screen. The UK participants in this study showed significant between- and within-group differences. The clear expectation to screen for suicidality embedded within the vignette significantly influenced UK participants' intention to screen. Within the Australian sample, both groups had a significant increase in their intention to screen across time-points, but the difference between the Test and Control groups post-vignette intention to screen was not statistically significant.

The influence of a normative belief that suicidality screening should be conducted with people with post-stroke aphasia was found for SLTs in UK but not Australia. One possible explanation for this relates to baseline differences in the experience of participants. Participants from the UK reported more years of experience, both as SLTs and working with PwA, than the Australian participants. It is well documented that SLTs report low knowledge, skills, and confidence working with mental health (Northcott et al., 2018; Sekhon et al., 2015). The UK participant group may have felt more confident drawing on their previous experiences, and therefore reported higher intent to screen, than the Australian sample. This would be consistent with the TPB, which suggests people have a higher intention to perform a behaviour when they feel they can enact it successfully (Ajzen, 1991).

This being the first experimental TPB study within stroke research is a strength of the study, as is the inclusion of the qualitative data to further understand the statistical results. Similarly, the recruitment method leading to a diverse sample of SLTs working across the different points in the stroke pathway from both the UK and Australia is a strength of the research. It was important to undertake this experimental study to understand whether intention to screen PwA for suicidality could be influenced by the normative belief that this is an expected behaviour for stroke SLTs. Participants reported SLTs as one of the most common professional groups to complete mood screenings and reported an initial high intention to screen for low mood, but no intention to screen for suicidality. This research found all participants reported receiving training on aphasia and supported communication, but less than a fifth of these had received training on suicide or suicidality screening. This is consistent with other research which documents that SLTs receive limited training in mental health (Doud et al., 2020; Sekhon et al., 2022).

Qualitative analysis found lack of confidence to be a barrier to screening suicidality in SLTs. Self-perceived competence, access to appropriate tools, and unclear role expectations were also found to be barriers to undertaking suicidality screening. Facilitators to increasing intention to screen were also identified in the qualitative analysis. These included additional training on suicide and suicidality screening, appropriate tools and resources to support this, clear role delineation and expectations, and further support to both clinician and patient if screening identifies the presence of suicidality. This finding is consistent with a previous qualitative study by Baker and colleagues explored stroke staff perceptions of managing low mood in PwA. Their findings highlighted a lack of clarity in professional roles among the multidisciplinary team and limited support available within stroke services, as limiting professionals engagement in screening and managing mood difficulties in PwA (Baker et al., 2021). This demonstrates how more clarity and support is needed for professionals working in stroke services. This highlights that scope of practice concerns (specifically boundaries with clinical psychology) are not a new phenomenon in aphasia research or clinical practice and gives further prominence to the importance of delineation of role.

The current evidence base for the TPB is dominated by correlational studies (e.g., Asare, 2015; Godin et al., 1992; Godin & Kok, 1996; Noar &

Zimmerman, 2005; Norman & Conner, 2006; Schlesinger et al., 2023; Weinstein, 2007), while randomised experimental designs are rare. A systematic review found a lack of studies which systematically use the TPB to develop interventions and test behaviour change (Hardeman et al., 2002), and there has been few such studies since. Of research aiming to test the TPB (e.g., Kinmonth et al., 2008; Sniehotta, 2009; Stead et al., 2005), only one study has utilised a full-factorial experimental design (Sniehotta, 2009) which focused on physical activity and lifestyle behaviours. Within the stroke literature, TPB research primarily utilises cross-sectional, self-report survey methods to further understand behavioural intentions (e.g., Ab Malik et al., 2018; Gillespie et al., 2020; Schlesinger et al., 2023) or cohort studies to predict behaviour (Bonetti & Johnston, 2008). To our knowledge, this is the first study to utilise a randomised experimental design to test the effects of the TPB within stroke literature and focused on screening mood and suicidality.

There are a number of limitations of the current study. The method of recruitment meant that our sample may have had a particular interest in screening and/or aphasia, possibly limiting the generalisability of our findings. There was a high attrition rate, as 129 respondents did not complete the study in its entirety and therefore could not be included in the analysis. It was not possible to analyse if this attrition was random or not, but no pattern was detected in the information that was gathered (such as time of day questionnaire started, point of attrition within questionnaire, or clinical setting of participant). Additionally, a limitation of the current dataset is that the data was not able to be transformed to meet parametric assumptions, therefore multiple non-parametric tests were determined to be the most appropriate for use, despite the possibility of increasing Type 1 Error. Additionally, the dataset does not test the impact of changing behavioural intentions on changing behaviour. It was outside the scope of this research to audit actual staff screening practices and identify objective rates of suicidality screening. A systematic review has found that self-reported intention does predict clinical behaviour (Eccles et al., 2006), therefore it is possible that the increase in screening intention identified in this study could be mirrored by an increase in clinical practice, though this remains to be tested.

This research has implications for clinical practice. As previously mentioned, our findings mirror that of Schlesinger et al. (2023) in which stroke professionals routinely screen for low mood, but rarely screen for suicidality. This is in spite of national guidance recommending this. Therefore, our findings demonstrate that these recommendations alone are not leading to behavioural change, and more effort is required to support staff to implement these recommendations, as normative beliefs within services appear to have a bigger impact. Further, it is important that professionals at all levels understand the factors which will facilitate further suicidality screening in PwA and take action to address the gaps. Multidisciplinary action is required to create resources that are accessible for PwA that can be used to support staff screening for suicidality. Kneebone et al. (2013) created a protocol through which occupational therapists were supported to screen for low mood and suicidality in stroke survivors with and without communication difficulties; however, it was found that the suicide question was not being asked or recorded on patient records. Kneebone et al. hypothesise this could be due to communication difficulties, therefore further highlighting the need for appropriate tools to aid this screening in people with communication difficulties.

This research has significant implications for improving post-stroke suicidality care, on both a clinical and policy level. This research highlights how service level change can influence staff screening intentions through setting a clear normative belief, that screening PwA for suicidality is an expectation of staff. Additionally, our qualitative findings provide information on the factors likely to facilitate an increase in screening, of which clear role expectation and delineation was identified. This suggests that stroke services can increase rate of screening by communicating clear, unambiguous normative beliefs regarding the expectation to screen for suicidality in PwA, for example, through updating internal policies, job descriptions and auditing screening rates, as well as regular conversations in team discussions and meetings.

In conclusion, the inclusion of normative beliefs within the vignettes resulted in significant change over time in the intention of screening for suicidality, suggesting the benefit for stroke teams of communicating clear expectations about suicidality screening within services. Further, SLTs reported feeling they lacked knowledge, competence, and confidence to complete suicidality screening in PwA. The reasons for this are multifaceted: a lack of training, a lack of resources, and a lack of ongoing support for both the professional and patient. These findings have significant implications for the improved detection and treatment of post-stroke suicidality.

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# Chapter 4 – Additional Methodology

Providing additional information on healthcare contexts, survey creation, and recruitment

# Additional Methodology

This chapter provides additional information on the differing healthcare contexts between the United Kingdom (UK) and Australia, the design and creation of the survey used for the empirical paper, and further information on recruitment methods and considerations.

## Healthcare Contexts

The empirical research study for this thesis portfolio comprised of an experimental online study, with international recruitment from the UK and Australia. Australia was chosen as an additional country for recruitment due to it being a forerunner in aphasia research with dedicated aphasia research centers, including the Queensland Aphasia Research Centre at the University of Queensland and the Centre for Research Excellence in Aphasia Recovery and Rehabilitation at La Trobe University. The following section outlines the healthcare systems of these two countries to provide the reader with a clearer sense of the context of the research.

### *UK Healthcare*

The UK has a healthcare system that has access based on clinical need, rather than ability to pay; the National Health Service (NHS). Access to this system applies to everybody, irrespective of nationality or immigration status, for use of primary, emergency, and compulsory psychiatric care, free of charge; however, only those who are ordinarily residents have free access to secondary care services (Anderson et al., 2022). The four constituent countries that make up the UK all have separate healthcare systems organized and delivered by their respective governments (NHS Careers, 2022).

The National Health Service Act (1946; now 2006) came into effect following the Beveridge Report (1942) which outlined a comprehensive system of social insurance and welfare, and the NHS was set up. Within England, the government owns the hospitals and other providers of NHS care, including NHS Trusts. NHS England is the overarching national body.

There are more public agencies, however, which are involved in the overall healthcare governance, including: NHS Improvement, the Care Quality Commission, the National Institute for Health and Care Excellence (NICE), and Health Education England (Thorlby, 2020). These agencies aim to ensure a smooth running of the NHS through ensuring standards of care, safety, and quality of care, setting guidelines for clinically effective treatment and planning the NHS workforce. Within Wales, Scotland and Ireland, there are different health boards and systems through which health services are delivered under the NHS. This means that there are differences in how the four UK countries are delivered, including guidelines which they are steered by. For example, England is guided by NICE, whereas Scotland follows the Scottish Intercollegiate Guidelines Network recommendations. Additionally, the Mental Capacity Act (2005) provides a legal framework which protects vulnerable adults in England and Wales, the Adults with Incapacity Act (2000) protects people's liberty in Scotland, and the Mental Capacity Act (Northern Ireland) (2016) provides legislation for Northern Ireland.

Throughout the UK, the majority of the NHS funding is from general taxation, with a smaller proportion being from national insurance. However, the NHS also receives some income from private patients using NHS services and income from copayments (Thorlby, 2020). Services which are not offered by the NHS are usually financed through private medical insurance (Anderson et al., 2022). Additionally, the NHS commissions some healthcare through privately run settings, such as some specialist inpatient neuro-rehabilitation units. There is an increasing shortage of healthcare professionals and infrastructure; with the UK having lower levels of doctors and nurses, hospital beds and diagnostic equipment, relative to the amount of people it serves, than most other high-income countries (Anandaciva, 2023). This is leading to increased waiting times, and increasingly more people using private medical insurance to access NHS-covered services more quickly (Anderson et al., 2022).

Additionally, within the UK there are government mandates for the NHS, outlining objectives to achieve within given timeframes. The most recent of which for NHS England, focuses on recovering the NHS, through reducing waiting lists, supporting the workforce through training, retention and modernization, and more effective use of data and technology (Department of Health & Social Care, 2023a). This comes as the NHS experiences some of the most severe pressures since its conception (British Medical Association, 2023). This increasing pressure has resulted in growing waiting lists for care, with over 6 million people in England alone on a waiting list in 2022 (Anderson et al., 2022). Similarly, there are over 272,000 people using their own funds to pay for private healthcare and over 547,000 people using private medical insurance policies to gain access to care outside of the NHS, which is the highest number since before the COVID-19 pandemic in 2019 (Private Healthcare Information Network, 2023).

The NHS is working together with the Stroke Association, NHS RightCare, ‘Getting it Right First Time’ and a range of other professional and voluntary sector bodies to deliver a national programme of improved stroke care. Part of this includes a new national service model for integrated community stroke services, as part of the NHS Long Term Plan (2019) with coordination of care from hospital to home-based rehabilitation care through a multidisciplinary team across seven days per week, and integrated stroke delivery networks across seven regions of England (NHS England, n.d.). The biggest implication on stroke care is staffing; as many stroke services do not have the optimum levels of staff across the professional disciplines (Intercollegiate Stroke Working Party [ISWP], 2021, 2022), including psychology staff despite guidelines being explicit regarding psychology forming part of the core team in both acute and community services (British Psychological Society, 2023; ISWP, 2023; NICE, 2023).

### *Australian Healthcare*

Within Australia, there is a regionally administered public health insurance programme called Medicare. This is financed through both general tax revenues and government levy. Anybody who has Australian citizenship is automatically enrolled into the programme and receives free public hospital care and additional coverage for other services (Glover, 2020). Medicare was established in 1984 (Australian Institute of Health and Welfare, 2018).

Australian healthcare is more complex than healthcare in the UK, as different levels of governments have different areas of responsibility but collective responsibility for universal healthcare provision (Glover, 2020). The federal government is responsible for regulation of private health insurance and therapeutic goods, and funding for inpatient and outpatient care, although has a limited role in service delivery. States own and manage service delivery for public healthcare and contribute their own funding and regulate private hospitals and the healthcare workforce. Finally, local government supports the delivery of community health and preventive programmes, such as vaccinations (Department of the Prime Minister and Cabinet, 2014).

Not all services are subsidised by Medicare, for example ambulance services or dentistry are not (Australian Institute of Health and Welfare, 2022), therefore Australian citizens use private health insurance to fund these services. Over half of Australians have private health insurance and the number of people with this continues to increase (Private Healthcare Australia, 2023), therefore there is a far greater provision of private services in Australia compared to just 22% of people in the UK (Fleck, 2023). Healthcare insurance in Australia covers out-of-pocket fees, offers greater choice of providers, and provides faster access to healthcare.

Within Australia, there is a greater reliance on parallel private health options to relieve the pressure on the public health system (thereby reducing waiting times) as people are encouraged to use more private hospital care through their private health insurance. More specific data on waiting times across Australia, however, is difficult to obtain and compare across the different states and jurisdictions, as measures of waiting times may differ (Yang et al., 2023).

Similar to the UK, the Australian healthcare system is facing a high degree of pressure, with emergency departments' performances at a record low, an increase in waiting times for children's emergency care, and less surgeries being performed due to hospitals being overcrowded (Australian Medical Association, 2022).

The main implications for stroke care across Australia relate to the different health systems. Inpatient hospital care and interventions are free to access for Australian citizens (Department of Health & Aged Care, 2018), however post-discharge access to Speech and Language Therapists (SLTs) or Clinical Psychologists may be delivered by private practitioners, which may not be covered fully by Medicare and therefore require the patient to pay for part of this. This limits the universal access to post-discharge care and rehabilitation for those who have had a stroke in Australia.

The primary difference between stroke care in the UK and Australia is access to specialist care. Although both healthcare systems provide access to specialist care, within the UK this ongoing care (e.g., psychology or speech and language therapy) would be accessed at no additional cost, whereas in Australia this may require additional cost for the patient. This has implications for people who may not be able to afford this additional cost, and the level of care they are then able to afford.

## Survey Design

### *Vignettes: Creation and Collaboration*

The primary aim of the survey was to test the prediction that normative beliefs influence staff intention to conduct suicidality screening with people with post-stroke aphasia. The use of vignettes permitted direct comparison between a test condition, designed to set a normative belief that suicidality should be screened in this context, with a control condition, setting a normative belief that dysphagia should be screened.

Vignettes provide an experimental stimulus with which to gauge participant responses to hypothetical or presumptive situations (Wilks, 2004). Vignettes have the benefits that they are easy to implement in online surveys (Aguinis & Bradley, 2014), provide an effective tool for qualitative and quantitative research (Erfanian et al., 2020), and are a commonly used psychological research method to manipulate stimulus information (e.g., Dorahy et al., 2017; Hundt et al., 2016; Neal et al., 2012). Case vignettes have been successfully used within stroke research (e.g., Carin-Levy et al., 2021; Geraghty et al., 2020; Levine et al., 2018) and TPB research (Green et al., 2008; Schomerus et al., 2009). They have already been employed within obstetrics and midwifery research to evaluate discrepancies between guidelines and clinical practice, to assess the quality of care provided (Rousseau et al., 2015, 2016, 2019). They were therefore considered a viable method for this study which would take into account the sensitivity of asking clinicians to self-report screening intention, which may have gone against their duty of care.

The use of vignettes is debated, however, with some expressing doubt about their ability to represent social realities (Barter & Renold, 2010; Hughes, 2001) and concern that should participants not feel the vignette accurately reflects their experience, they might have difficulty adopting the role of the vignette character, affecting results (Hughes & Huby, 2002, 2004). It is important, therefore, that the consistency between vignettes and real-life situations be considered. As a result, the creation of the vignettes in the study was informed by a panel of clinical psychologists, clinical neuropsychologists, and SLTs working in stroke services with people with aphasia (PwA). The rationale for this was to ensure that the experimental and control vignettes provided an accurate, representative portrayal of the clinical presentation of a person with aphasia experiencing low mood and suicidality, and the role of an SLT.

Townend et al. (2007) recommend that depression experts collaborate with language experts when considering how to include PwA in post-stroke depression research. Both clinical psychologists and SLTs are typically involved in screening PwA in stroke services. Research suggests, however, that SLTs do not always feel confident in addressing psychological needs of PwA (Northcott et al., 2018), whereas clinical psychologists do not always feel confident in their ability to adapt communication skills to work with PwA (Baker et al., 2021). This highlights the continued need for a collaborative approach to working with PwA, in both research and clinical practice.

### ***Vignettes: Piloting***

Vignettes are typically piloted to evaluate the representation of the subject under investigation (Flaskerud, 1979; Gould, 1996); and increase the internal validity of vignettes and associated questionnaires (Erfanian et al., 2020). For this reason, the vignettes were sent to the original panel of psychologists and SLTs and their feedback was collated and actioned. An anonymous survey was also sent to first- and second-year Trainee Clinical Psychologists (TCPs) at the University of East Anglia (UEA) to pilot the vignette. The decision was made to conduct the pilot with TCPs to ensure the potential recruitment pool of SLTs was not impacted by seeing vignettes prior to study participation. The pilot survey included the vignettes alongside four questions relating to the normative belief; the TCPs were asked whether, through reading the vignettes, a normative belief was developed about screening to identify a clinical risk, what that risk is, the strength of the normative belief, and what could be changed to increase the strength of the normative belief. This feedback was gathered to ensure the vignettes accurately captured the role of stroke services and SLTs, as well as whether the normative beliefs had been conveyed and the importance of this reflected within the text.

It is suggested that the impact on behavioural intentions, of "each normative belief about an important other, is multiplied by the individual's motivation to comply with that important other" (Trafimow, 2020). It is important therefore to gather feedback on whether the vignettes accurately portrayed the desired normative belief itself and the importance placed on this belief by important others (in this case, a fictional stroke team).

### *Questionnaire Creation*

The Theory of Planned Behaviour (TPB) questionnaire used in this thesis was developed by Hope Schlesinger as part of a previous Doctorate in Clinical Psychology thesis portfolio (Schlesinger, 2021). The questionnaire was developed in collaboration with clinical psychologists, SLTs and statisticians. Consent was obtained from Hope Schlesinger to make use of the questions within this thesis (Appendix G).

Upon gaining this consent, and ethical approval from UEA, the next phase was identifying a suitable online platform for the questionnaire. The platform had to meet the following requirements: it needed to be priced within the available funds of a ClinPsyD thesis budget; to allow for randomization of participants into different conditions; to comply with GDPR regulations; and be user-friendly for those completing it. After considering a range of online platforms, the survey was implemented and presented online on the PsyToolkit platform (Stoet, 2010, 2017). PsyToolKit requires the user to code their survey or experiment using C-code (a general-purpose computer programming language; Ritchie & Kernighan, 1988), which necessitated learning how to use this coding system. This scripting language that PsyToolKit uses for C code allows for a straightforward way to code a survey or experiment using building blocks that make sense in a psychological context (Stoet, 2010, 2017), and the platform provides helpful documents to support the learning and implementation of this code. The script permits randomisation to different conditions, minimisation of missing data, if/then statements, and routing questions based on answers.

The creation of the survey added unexpected additional time to study preparations, as the need to learn a new coding system had not been foreseen. The coding process was time-consuming, requiring multiple pilots of the survey. However, the elements of the PsyToolKit code supported a more efficient experience for participants.

## Recruitment

### *Sampling*

Upon receiving ethical approval from the UEA Faculty of Medicine and Health Sciences Research Ethics Committee (Appendix J), participants were recruited via an online snowballing campaign. Snowball sampling is a well-recognised, common, and viable method of recruiting study participants that are not known to the researcher (Marcus et al., 2017; Naderifar et al., 2017); it is defined as a recruitment method in which the researcher does not directly recruit all participants themselves, but contacts potential participants who recruit further participants among their networks (Parker et al., 2019). This recruitment method made use of convenience sampling, in which the researchers announce the study and participants self-select if they wish to participate (Stratton, 2021). Snowball sampling is often used for exploratory research or research in which the population under investigation is hard to reach, such as due to the sensitivity of the research or topic (David & Sutton, 2011; Naderifar et al., 2017).

Within this thesis, snowball sampling was used for two reasons. The first was due to the focus on both UK and Australian SLTs. It was determined that reaching participants over 9,000 miles away would be challenging through any means other than email and social media, therefore snowballing sampling was seen to be an easy solution to this difficulty (Leighton et al., 2021). Additionally, this method of recruitment would permit recruitment of a wider range of professional seniority, service location and type of stroke service across both countries. The second reason related to the sensitivity of the research. Although stroke guidelines did not include a recommendation to complete suicidality screening at the time of recruitment, participants were asked to self-report a potential conflict with duty of care by not seeking to detect a risk of suicide. This had the potential to be a sensitive topic that could result in a high degree of social desirability bias, therefore anonymous recruitment via social media may counteract this and facilitate honest participation (Dodou & de Winter, 2014).

Although snowball sampling permitted recruitment of a broader sample of participants and made it easier to access participants living in Australia while conducting the research in the UK, it is not without limitations. There are arguments that participants often recommend the survey to others based on their individual perceptions about whether the ‘new recruit’ will be willing and cooperative (Parker et al., 2019), potentially resulting in risk of bias. Additionally, this sampling method can be prone to volunteer bias, in that those who volunteer to participate may differ from those who do not (Tripepi et al., 2010), and there can be a skewed participant pool due to the use of social media.

Within the current research, the use of snowball sampling via social media raises a potential risk that the sample recruited may have a particular interest in screening and/or aphasia and limits the possibility of those who do not use social media taking part, potentially limiting the external validity of the research (Ferguson, 2004). External validity refers to the extent to which the results can be generalised to the wider population and is dependent on the characteristics of the sample and how much they represent the entire population (Tripepi et al., 2010). The approach to recruitment adopted counteracted these limitations through ‘word of mouth’ between colleagues and professional bodies to share the survey via email or in person, thereby reaching those not on social media and SLTs with a general interest in aphasia but not necessarily in screening. Finally, it was hoped that this recruitment method was suitable for a time when pressure on healthcare staff was at an all-time high (Yuan et al., 2014), allowing participants to take part in the survey at a time more convenient for them.

### ***International Recruitment***

The online recruitment methods were three-fold, with all methods used across the UK and Australia. Firstly, the survey was advertised by sharing an advertisement and survey link on multiple social media platforms (Facebook, LinkedIn and Twitter) and asking others to repost the advertisement and survey link (Appendix O). Hashtags were used on Twitter, such as “#MySLTday’ and ‘#SLT2B’ (see Appendix P for a full list) when advertising on this platform. Similarly, throughout June, the survey was posted on social media using the hashtag ‘#AphasiaAwarenessMonth’. When sharing the survey on social media, statistics or information about aphasia were shared alongside the advertisement to raise the profile of, and interest in, the study (see Figure 1 for an example) and thus reach a wider range of SLTs from a diversity of locations, health settings, and experience.

Secondly, UK- and Australian-based professional bodies and aphasia special interest groups were contacted by social media and email. Organisations were invited to share the survey with consenting members and on social media accounts (see Appendix Q for a full list of societies, organisations, and special interest groups). The organisations agreed to share the survey with their members via email or social media or to repost the original post on their own social media accounts.

Finally, the third recruitment method used word-of-mouth advertising, by inviting participants who completed the survey to inform their colleagues about the survey. This aimed to use a sampling approach known as the “chain method” (Polit & Beck, 2021). This had some success, as emails were received from people who had heard about the survey from a colleague or friend to ask a question or express interest in the survey. The undergraduate Speech and Language Therapy course at the University of East Anglia was also contacted and a lecture provided to SLT students on aphasia, mood challenges, and psychological understanding. The survey link was shared at the end of this lecture and students were invited to share this with friends or placement colleagues.

**Figure 1**

*An Example Social Media Post Advertising the Study*

**Siân Carroll** @siancarroll_ · Feb 13

#DidYouKnow around 1/3 of people who have a #stroke experience #aphasia? That's over 350,000 people in the #UK and over 140,000 people in #Australia! Speech & Language Therapists / Pathologists are vital in supporting people with aphasia - can we help more? Links below! #MySLTDay

University of East Anglia

SPEECH AND LANGUAGE THERAPISTS!

DO YOU WORK WITH PEOPLE WITH POST-STROKE APHASIA IN THE UK OR AUSTRALIA?

Depression is common after stroke, especially for someone with aphasia.

Please complete our short, anonymous, online questionnaire on supporting people with post-stroke aphasia and your work supporting them.

The questionnaire has ethical approval from the University of East Anglia. It takes 15 minutes to complete and we hope it will inform continued improvement in support for people with post-stroke aphasia.

FOR MORE INFO:
Please email
sian.carroll@uea.ac.uk
Trainee Clinical Psychologist

TALKING
WRITING
READING
NUMBERS
APHASIA

CLICK THE LINK OR QR CODE TO TAKE PART!

UK: https://www.psytoolkit.org/c/3.4.2/survey?s=gEAYm

AUS: https://www.psytoolkit.org/c/3.4.2/survey?s=3n2PF

### *International Recruitment Challenges*

Initially, conducting research in a country on the other side of the world felt like an enormous challenge to overcome. Finding relevant information regarding the accreditation of SLTs, appropriate and professional special interest groups, and organisations through which the survey could be circulated, was difficult to begin with. However, the use of social media greatly supported this challenge by facilitating networking with accredited Speech and Language Pathologists (as they are known in Australia) who could provide information and links to other services. Similarly, the research team’s existing contacts with Dr Ciara Shiggins at the Centre for Research Excellence in Aphasia Recovery and Rehabilitation at La Trobe University, and Professor Ian Kneebone at the University of

Technology Sydney, provided signposting to organisations across Australia that were potential avenues for recruitment.

The biggest challenge to recruitment was high attrition. International recruitment yielded 215 participants across both countries. After removing incomplete datasets, 86 participants were left, to form the participant pool that was analysed. This resulted in an attrition rate of 60%, and response rate of 40%. Although research suggests that the average online survey response rate is 44.1% (Wu et al., 2022) and dropout rate is 42% (Galesic, 2006), which is not dissimilar to the current research, it was, understandably, disappointing and steps were taken to better understand attrition.

The data of each participant that dropped out were examined. No pattern emerged in the settings in which participants who dropped out worked, the time or day of the week when the survey was accessed before it was closed, or the point at which participants dropped out. Once outliers were removed, the average survey completion time was 17 minutes. Research suggests that questionnaires should be administered within 30 minutes to keep the interest and attention of participants, therefore reducing dropout (Sharma, 2022). Further research suggests that 10% of participants drop out almost immediately, and a further 2% per every 100 questions (Hoerger, 2010). Given that the current research had only 64 questions in total, it was not felt that the dropout rate could be attributed to survey length. It was hypothesised that current pressures on healthcare systems in the UK and Australia may have led participants to be less inclined to want to think about the topics covered by the survey outside work and to have less time to complete it while at work. The complexity and sensitivity of the topic being researched should not be underestimated and could have impacted noncompletion rates. Additionally, the current context of the continuing impact of the COVID-19 pandemic, a cost-of-living crisis and climate change, may have made research participation less of a priority for some.

In conclusion, the primary difference between Australian and UK health systems is the use of private insurance to fund medical care, and the impact this can have on individuals’ ability to access care. This can have implications for stroke survivors, as in the UK post-discharge, ongoing care, such as that provided by SLTs is available to access through the NHS, whereas in Australia this is largely delivered by private practitioners and insurance may not cover the cost of these services. The vignettes for this survey were developed collaboratively with a panel of clinicians working in stroke services and underwent a piloting process to ensure they accurately reflected a stroke service, and the normative beliefs were apparent. Finally, recruitment considerations and challenges were discussed, including the challenge of international recruitment and high attrition rates in online research.

# Chapter 5 – Discussion and Critical Evaluation

# Discussion and Critical Evaluation

The aim of this thesis was to identify factors associated with completed suicide after stroke and test whether the intention of Speech and Language Therapists (SLTs) to screen people with post-stroke aphasia (PwA) for suicidality could be increased by conveying a clear normative belief that this screening is an expectation of staff.

Post-stroke suicidality and the needs of PwA are under-represented within stroke research despite evidence that PwA are more likely to develop post-stroke depression than stroke survivors without aphasia (Hilari, 2011; Kauhanen et al., 2000), and those with post-stroke depression are more likely to die by suicide compared to a non-stroke population (Vyas et al., 2021). In recent research stroke professionals reported being unlikely to screen for suicidality in PwA (Schlesinger et al., 2023), so it is imperative to understand not only the factors associated with completed suicide after stroke, but also how stroke professionals can be encouraged to screen for suicidality.

There is a growing emphasis placed on psychological care post-stroke, including post-stroke suicidality. The Stroke Association and the James Lind Alliance reported psychological support, interventions, and improvement as the top priority for research in stroke rehabilitation and long-term care (Stroke Association, 2021b). Clinically, one of the six values delineated in the NHS Constitution sets out the importance of ensuring everybody has access to the resources available within the NHS without discrimination, despite any additional difficulties or needs they may have (Department of Health & Social Care, 2023b). It is hoped that the findings and recommendations from this portfolio will increase understanding of post-stroke suicidality and how to increase detection of this, including in PwA.

## Overview

The systematic review of 18 studies synthesised the current available evidence on risk factors for completed suicide after stroke; finding males, being under 65-years-old at time of stroke, being within the first two years post-stroke, being employed at the time of stroke, experiencing additional health complications, having a shorter duration of hospital stay initially following stroke, and ischaemic strokes are factors associated with a greater risk of post-stroke suicide. Further risk factors were identified across studies (marital status; living arrangements; location of stroke; stroke severity; impact of stroke; education level; ethnicity) but limited data precluded drawing firm conclusions about these.

The results of the systematic review were similar to previous reviews synthesising risk factors for post-stroke suicidal ideation but focused on completed suicide, and a wider range of demographic and clinical risk factors. Harnod et al. (2018), Pompili et al. (2012) and Vyas et al. (2021) also found younger age to be a risk factor for suicidal ideation post-stroke. As our review also suggested employment to be a risk factor, it was hypothesised that, due to an increasing number of strokes occurring in working age adults, a change and loss in productivity and meaning as a result of the stroke may lead to the development of suicidality, which is consistent with previous stroke and suicide literature (e.g., İlgün et al., 2020; van der Kemp et al., 2019; van Velzen et al., 2009; Vyas et al., 2021; Yoshimasu et al., 2008). Inconsistent with other reviews, however, is our finding that males are more at risk of dying by suicide post-stroke. This differs from the findings of Pompili et al. (2012) possibly reflecting their focus on suicidal ideation and attempts, which occur more in women, compared to our focus on completed suicide, which is more common in men (Martínez-Rives et al., 2021; Samaritans, 2021).

The Theory of Planned Behaviour (TPB) experiment with 86 SLTs working with PwA found that the presence of a normative belief increased self-reported intention to screen for suicidality in participants from the United Kingdom (UK). A positive change was also observed in Australian participants, but this did not reach significance. The study replicated and extended the work of Schlesinger and colleagues (2023) with UK stroke professionals, finding that significantly more SLTs are likely to screen for depression than to screen for suicidality in UK and Australian services. Qualitative findings indicated that SLTs believe additional training and resources, clear role delineation and expectations, and further support would facilitate intent to screen. In contrast, lack of confidence, perceived competence, and expectations regarding professional role emerged as barriers to their screening for suicidality. This is consistent with other research finding that SLTs report blurred boundaries between SLTs and Clinical Psychologists when it comes to working with PwA, giving further prominence to the importance of clearly delineating roles within services (e.g., Baker et al., 2021; Cruice & Ten Kate, 2019; Northcott et al., 2018; Sekhon et al., 2015, 2022).

## Strengths and Limitations of Systematic Review

The systematic review presented in this portfolio is the first to synthesize research on completed suicide post-stroke, providing an important contribution to an under-researched area. Although it is important to acknowledge that risk factors do not reflect the entirety of an individuals' risk, and suicide can be completed by people who are not considered high risk from risk factors (Weber et al., 2017), the review provides important information for professionals to consider who may feel unconfident with recognising suicide risk or completing risk formulations.

The search strategy was informed by previous systematic reviews on suicidal ideation post-stroke and developed in consultation with a specialist librarian. PRISMA guidelines were followed throughout, and a second rater independently checked 20% of a random sample of the included studies throughout the process; from ensuring it met inclusion criteria, to full text screening, to quality assessment. Alongside this, the review searched multiple databases and resulted in a broad set of studies from multiple continents and cultures, thereby reducing a potential Western bias.

The systematic review is not without its limitations, however. Primarily, the large discrepancies in both the quality and quantity of reported data across the included studies made it difficult to draw firm conclusions on risk factors for completed post-stroke suicide. This led to significant challenges in comparing studies using statistical methods and determining risk factors, as many studies failed to report demographic characteristics of their samples, and this information could not be obtained, despite requests to authors.

Further, the Newcastle-Ottawa Scale (NOS) was deployed as the most widely used and recommended tool for case-control and cohort studies (Higgins et al., 2019) with a well-documented reliability (Luchini et al., 2017). However, limitations of this tool must be considered. The NOS evaluates three quality parameters (selection, comparability, and outcome), although these parameters do not encapsulate all criteria for assessing the quality of research. For example, the tool does not provide space to consider issues of power; a few included studies appeared to be underpowered and had considerable differences in sample sizes for participants who died by suicide and those who did not, which were not taken into account. Similarly, the tool provides additional information through which reviewers can make decisions for each individual parameter item, however this information can be vague and unclear, therefore the ability of the tool to determine scores is open to subjectivity (Hartling et al., 2013; Higgins & Green, 2011). Finally, having two independent reviewers to complete screening, extraction and quality assessment of all studies was beyond the remit of the current review.

## Strengths and Limitations of Empirical Paper

The empirical study makes a unique contribution to research on screening for post-stroke suicidality and TPB research; to our knowledge, this is the first study to adopt a randomised experimental design to test the impact of manipulating a TPB factor within stroke research, and the first to conduct an experimental study on screening suicidality in PwA.

A systematic review found that studies using the TPB to test behaviour change are lacking (Hardeman et al., 2002). TPB research within stroke primarily uses cross-sectional, self-report survey methods (Ab Malik et al., 2018; Gillespie et al., 2020; Schlesinger et al., 2023). Moreover, research on post-stroke suicidality is scarce, particularly so in the case of research on identification or intervention. The use of the TPB model within this thesis adds to the growing body of research that uses this model to understand staff behaviour and intentions within stroke rehabilitation and care.

There have been recent updates to two major clinical health guidelines within stroke care; National Institute for Health and Care Excellence (NICE, 2023) and National Clinical Guidelines for Stroke (Intercollegiate Stroke Working Party [ISWP], 2023). These set out a standard of care and recommendations for effective treatments. Updates have included a greater emphasis on identifying and supporting mood difficulties post-stroke, including suicidality. As with previous stroke research, the current study used the TPB model to understand staff intentions and recommend how services can improve adherence to guidelines (Gillespie et al., 2020; Hart & Morris, 2008).

Another important strength of this study is its application of a theoretical model of behaviour and experimental methodology to test a specific prediction about how to improve intention to screen. This contrasts with previous research which has typically used cross-sectional surveys to identify screening rates and factors associated with these. Furthermore, the vignettes used in the experiment, were informed and piloted with stroke professionals, including SLTs, clinical psychologists and clinical neuropsychologists, and considerable effort was made to ensure these presented a realistic depiction of a person with aphasia experiencing low mood and suicidality, and a representative portrayal of the role of SLTs. Creating two vignettes permitted direct comparison between the impact on screening intention, of a test condition, designed to set a normative belief that suicidality should be screened in this context, and a control condition, setting a normative belief that dysphagia should be screened. The theoretical underpinning and use of vignettes in this way contribute to the robustness of the study.

A further strength of this study is that participants were recruited from two countries with distinct health systems and via professional bodies, professional interest groups and social media. This resulted in a diverse sample of SLTs working across different points in the stroke pathway from two different countries: the UK and Australia. This method of recruitment led to a broader dataset than what would have been found through using pre-selected organisations. From this it is clear that limited screening with PwA is not an issue specific to the UK or to more junior staff, as a large proportion of the participants reported more than a decade of experience working with PwA as an SLT. Our findings are consistent with other research documenting SLT concerns regarding managing issues felt to be outside the scope of an SLT, such as mental health, in which low knowledge, skills, and confidence is well-reported (Doud et al., 2020; Northcott et al., 2018; Sekhon et al., 2022).

A final strength of this study is the analysis of qualitative data. Not only did this analysis contextualise the results of the quantitative analyses, but it also provided clear suggestions about how intention to screen could be increased in SLTs. Open-ended qualitative questions, such as “What factors in the vignette influenced your decision on screening this person?” and “What would be required for you to feel more likely to screen for suicidality in this population?” were asked to gain insight into the factors influencing participants’ responses on visual analogue scales and facilitators or barriers to suicidality screening with PwA. The answers to these questions provide concrete recommendations to support services with ways to implement updated guidance on post-stroke suicidality (ISWP, 2023; NICE, 2023).

The empirical paper is subject to some limitations. First, the use of Mann-Whitney U and Wilxocon-Signed Rank tests could be seen to increase Type 1 Error due to the use of multiple tests. However, following consultation with a statistician, this was determined to be the most appropriate use of tests considering the non-normality of the data. Additionally, the use of vignette methodology could be regarded as problematic as it is argued by some that vignettes do not accurately represent social realities (Barter & Renold, 2010; Hughes, 2001). This potentially raises concerns that participants may struggle to adopt the role of the vignette character if they do not feel it accurately reflects their experience, potentially influencing results (Hughes & Huby, 2002, 2004). We attempted to mitigate this risk during vignette development, through the inclusion of SLT and psychology colleagues, thereby ensuring that vignettes provided an accurate representation of working with somebody with aphasia in distress.

Vignettes can be an important and helpful tool when it comes to understanding and measuring peoples' beliefs, perceptions, values and dispositions (Barnatt et al., 2007; Finch, 1987). However, some researchers criticize their use as they are seen to create distance between researcher and participant (Barter & Renold, 2010; Hughes & Huby, 2002; Schoenberg & Ravdal, 2000). Participants are typically requested to respond in the third person to the vignette, rather than drawing on their own experiences, thereby desensitizing the subject matter. In this study, this distance could have impacted results as participants may not have experienced a level of concern regarding the patient, to a level required to trigger intent to screen for suicidality. In contrast to these concerns, Richman & Mercer (2002) reported that in their research the vignette acted as a prompt to personal experience and as a vehicle for reflection, which has been noted in other research in which participants show willingness to draw unprompted on their own experience after being presented with vignette material (Bradbury-Jones et al., 2012).

Despite this, vignettes have successfully been used within psychological research, including in PTSD (Dorahy et al., 2017; Hundt et al., 2016), criminal justice issues (Guy & Edens, 2006; Krauss & Sales, 2001; Neal et al., 2012), and psychological treatment (Clark et al., 2017; Currin et al., 2006). Case vignettes have also been successfully used within TPB research (Green et al., 2008; Schomerus et al., 2009), and stroke research (Carin-Levy et al., 2021; Geraghty et al., 2020). This provides further evidence for the use of vignettes within the current research.

Several authors have suggested that there may be a difference between what people believe that they would do and their actual actions in a given situation (Barter & Renold, 2000, 2010; Gliner et al., 1999; Hughes & Huby, 2004). This speaks to a longstanding debate on the relationship between belief and action (Hughes & Huby, 2004). Critics of the TPB recognise an intention-behaviour gap (Conner & Norman, 2022); which Ajzen (2020) acknowledges. This means that a measure of intention does not necessarily predict actual behaviour, therefore a change in intention does not always equate to a change in behaviour. Meta-analytic syntheses have found that intentions account for between 27-44% of the variance in behaviour (e.g., Armitage & Conner, 2001; Downs & Hausenblas, 2005; Hagger et al., 2002; Sheeran, 2002) which might bring into question the usefulness of the TPB as a model.

Other criticisms of the TPB are summarized in an article by Sniehotta et al. (2014). Shiehotta and colleagues note that the theory assumes that behaviour is determined by attitudes, normative beliefs, and perceived behavioural control, and a range of factors that influence behaviour not considered within the model. They propose that the theory excludes unconscious influences on behaviour (Sheeran et al., 2013) and the role of emotions beyond anticipated outcomes (Conner et al., 2013), instead focusing solely on rational reasoning.

Human behaviour is notoriously difficult to predict, however, and no current theoretical model is without limitations. Additionally, even Sniehotta et al. (2014) acknowledge that the TPB has been shown to consistently predict behaviour, and that a large change in intentions is found to also produce changes in behaviour. Further, the TPB remains the model with the largest empirical support (Ajzen, 2015) and has successfully been applied to staff practice in stroke rehabilitation (Gillespie et al., 2020; Hart & Morris, 2008). Schlesinger et al. (2023) found the TPB principles accounted for a large proportion of the variance within their research, on which this empirical study was based, therefore making it the most applicable and appropriate model to use within this study.

The representativeness of the sample could be a further limitation to this study. The sampling methods used can be prone to bias; in that those who volunteer to participate may differ from those who do not (Tripepi et al., 2010). There could also be a skewed participant pool due to the use of social media and word-of-mouth advertising, which may lead to participants recommending the survey to others based on their individual perceptions about whether the ‘new recruit’ will be willing and cooperative (Parker et al., 2019), therefore potentially resulting in risk of bias. Additionally, this raises the potential risk that the sample recruited may have a particular interest in screening and/or aphasia, limiting the possibility of those who do not use social media taking part, potentially limiting the external validity of the research (Ferguson, 2004). External validity refers to the extent to which the results can be generalised to the wider population and it is of course dependent on the characteristics of the sample and how much they represent the entire population (Tripepi et al., 2010). Having under 100 participants raises the question of whether the participant pool is representative of the wider SLT population throughout the UK and Australia.

There was also high attrition in the study, with original data suggesting 215 participants had taken part, but with only 89 datasets finally being able to be included due to incomplete surveys. This resulted in an attrition rate of 60%. Research suggests that the average online survey response rate is 44.1% (Wu et al., 2022) and dropout rate is 42% (Galesic, 2006), which is not dissimilar to the current research. Nevertheless, steps were taken to further understand the attrition rate. No pattern emerged however in the settings in which participants who dropped out worked, the time or day of the week when the survey was accessed before it was closed, or the time point at which participants dropped out. It is hypothesised that the pressure of health services, as well as the complexity of the topic being researched, influenced the high attrition rate. Moreover, despite this high attrition rate, many of the participants had more than 10 years clinical experience, suggesting that those who were recruited had many years of experience to draw upon.

## Implications and Recommendations for Research

There is still much to learn about post-stroke suicidality and how to increase the likelihood of identifying those at most risk, especially in comparison to post-stroke depression. It is recommended that steps are taken by researchers to ensure as much demographic and clinical data as possible are reported when researching post-stroke suicidality, such as ethnicity and severity of stroke. This would permit better comparisons and research synthesis to support development of a more detailed understanding of post-stroke suicidality and associated risk factors. This thesis highlights the need for a focused approach to future research that will provide more consistent findings across studies.

Additionally, questions remain regarding the extent to which additional factors, such as confidence, influence intention to screen suicidality in PwA. It is recommended that further quantitative analysis of additional factors, both TPB (e.g., attitudes) and those identified in the qualitative analysis (e.g., confidence), takes place. This could include further regression analyses to further increase our understanding of barriers to screening, and in turn how professionals can best be supported to increase this intention and carry out screening. Moreover, it is recommended that further research should be undertaken to investigate staff experience of working with suicidality in PwA, and research including multidisciplinary expertise to create and validate measures and resources to help staff screen for suicidality in PwA. It is important that when further research into suicidality in PwA is conducted, that consideration is given to attrition rates within research and steps taken to minimise this, such as in person research or shorter online surveys.

A systematic review tentatively found that self-reported intention can predict clinical behaviour (Eccles et al., 2006). Eccles et al. found a similar, predictable relationship between intention and behaviour from 1623 health professionals over 10 studies, to that found in non-health literature. Therefore, despite firm conclusions being limited due to a smaller literature base, there is an arguable premise for believing that an increase in intention identified in this study could mirror an increase in actual staff practice. However, this would need further evidence. Therefore, for now it is recommended that further research test the impact of changing behavioural intentions on changing behaviour, through audit of staff screening practices to identify objective rates of suicidality screening. It is hoped this could underpin the creation of protocols to support staff to increase their screening, such as those set out by Kneebone and colleagues (Kneebone et al., 2010, 2013).

## Implications and Recommendations for Clinical Practice

This thesis has implications for clinical practice, which are timely given recent updates to the National Clinical Guideline for Stroke and NICE guideline for stroke rehabilitation for adults, including a greater focus on mental health post-stroke and identification of post-stroke suicidality.

The findings from this thesis suggest that not all people with post-stroke aphasia are screened for suicidality in either the UK or Australia. It is important to hold in mind that recruitment occurred prior to updated UK stroke guidance mentioning suicide prevention for the first time. Understanding the barriers and facilitators to suicidality screening is important for both the implementation of this screening and the safety of patients who use these services. It is recommended that training should be provided on depression and suicidality to all staff in contact with stroke survivors, paying particular attention to psychology and SLT colleagues who may be most likely to encounter post-stroke suicidality in PwA. It is also recommended that this training be personalised to the specific context of the team receiving the training, so that delineation of roles in individual teams can be discussed. This would require management consideration, and subsequent clear expectations from management and senior staff that suicidality screening is expected in line with new recommendations and guidelines (NICE, 2023; ISWP, 2023).

The findings replicate those of Schlesinger et al. (2023), in that the majority of SLTs report screening for low mood with PwA. However, this good practice was not universal, especially in terms of suicidality screening, in which the most commonly reported individual intention to screen was 0%. This research provides important evidence, therefore, that the risk of death from suicide is not routinely being assessed in PwA by stroke services across the UK and Australia. Medical professionals are in a key position to screen for suicidality and enhance suicide prevention, as up to 90% of individuals who die by suicide have contact with a medical professional within a year of their death (e.g., Draper et al., 2008; Luoma et al., 2002; Mughal et al., 2023; Stene-Larsen & Reneflot, 2019). It is known that asking about and acknowledging suicidality does not increase suicidal ideation but can reduce it and lead to improvements in mental health outcomes (Dazzi et al., 2014). Therefore, routine screening does not increase risk. A common reason given for not screening suicidality in the current research was a lack of resources to aid conversations with PwA. This clearly demonstrates that more resources are needed to support staff to meet the updated guidelines and to screen all stroke survivors for low mood and suicidality. Consideration should be given to developing resources to support suicidality screening post-stroke, and specifically in PwA. This would require multi-disciplinary expertise to ensure the usability of these resources.

Findings from the systematic review provide support for clinicians caring for stroke survivors. Our findings indicate potential risk factors for completed suicide post-stroke to consider when completing mood and suicide screening, risk assessment, and formulation of risk in line with NICE guidelines (NICE, 2022b). When considering the findings of this portfolio, it is important to consider risk as dynamic in nature, in that it can fluctuate dependent on other factors and contexts. Stratifying risk into categories (such as high, medium, or low) based on a singular risk assessment can lead to an insufficient and inaccurate picture of an individual’s safety needs and potentially result in harm (NICE, 2022c). When completing suicide screening with stroke survivors, it is important that this screening is used to inform a wider risk formulation, in which the person’s safety considerations and suicidality is considered in context with their strengths, difficulties, and any coexisting conditions (Hawton et al., 2022). This would provide a meaningful narrative of risk to inform future care.

## Conclusion

In conclusion, this thesis portfolio found that risk factors associated with increased rates of completed post-stroke suicide are male gender, younger age and employment at time of stroke. Studies of post-stroke suicide vary considerably in quality and quantity of data, limiting the conclusions that can be drawn. The thesis also found that suicidality screening in PwA is not routine practice, and that normative beliefs that it is an expectation that staff should screen suicidality in PwA were associated with increased intention to screen in UK participants. Qualitative findings also suggest that increased training, resources, expectations, and clearer delineation of roles would support an increase in intention to screen.

This portfolio emphasises the importance of screening for post-stroke suicidality in a population at higher risk of suicide than those who have not had a stroke, and the challenges of screening post-stroke suicidality in PwA. It provides a series of recommendations, for research and clinical practice, to further improve understanding of post-stroke suicide and the safety and care of those with post-stroke aphasia.

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# Appendices

Appendix A – Stroke Journal Requirements

## Author Instructions

***Stroke*** publishes reports of clinical and basic investigation of any aspect of the cerebral circulation and its diseases from many disciplines, including anesthesiology, critical care medicine, epidemiology, internal medicine, neurology, neuro-ophthalmology, neuropathology, neuropsychology, neurosurgery, nuclear medicine, nursing, radiology, rehabilitation, speech pathology, vascular physiology, and vascular surgery.

***Stroke*** accepts submission in three categories, Basic and Translational Science, Clinical Science, and Population Science.

### Basic and Translational Science

Research includes animal experiments, cell studies, biochemical, genetic and physiological investigations, and studies on the properties of drugs and materials. It also includes the development and improvement of analytical procedures, imaging procedures, gene sequencing, and the development of biometric procedures.

Authors are required to submit an online checklist requesting reporting of randomization procedures, blinding, a priori definition of inclusion and exclusion, etc. After selecting a Basic Science article type in the submission system, the form becomes available to complete as part of the submission process. If the manuscript is accepted, the form will be published as supplementary material. See "Reporting Standards for Preclinical Studies of Stroke Therapy" (Stroke. 2016;47:2435-2438) for more information.

### Clinical Science

Clinical research involves interactions with patients, diagnostic clinical materials or data, or populations in any of the following areas: (1) disease mechanisms (etiopathogenesis); (2) bi-directional integrative (translational) research; (3) clinical knowledge, detection, diagnosis and natural history of disease; (4) therapeutic interventions including clinical trials of drugs, biologics, devices and instruments; (5) prevention (primary and secondary) and health promotion; (6) behavioral research; and (7) health services research, including outcomes, and cost-effectiveness.

**Population Science**

Epidemiology is the science that investigates the patterns, causes, and effects of health versus disease in populations or patient cohorts. This involves, but is not limited to: (1) quantification and control of morbidity and mortality; (2) high-throughput “omics” and deep DNA sequencing; (3) longitudinal observations; (4) natural experiments (Mendelian randomization); (5) validation of potential disease-causing mechanisms identified in experimental studies and generating hypotheses for mechanisms to be tested in experimental studies; (6) use of “big data”, registries and “eHealth platforms”; and (7) systems biology and pathway analysis for integrating clinical with molecular data.

**How to Contact the Journal**

Argye E. Hillis, MD
Editor-in-Chief, *Stroke*
Email: stroke@strokeahajournal.org
Manuscript submission: https://stroke-submit.aha-journals.org/

**Editorial Process**

Submitted manuscripts are examined by the editorial staff and editors, and a decision is made whether to refer the manuscript for external peer review. In order to provide a rapid response to authors, manuscripts that are not likely to receive a priority sufficient for publication will not be referred for external peer review and will be returned after initial screening. Manuscripts sent for review that receive an initial favorable response will undergo independent statistical review, when appropriate. The editors will not discuss a decision about a manuscript over the phone. All appeals must be submitted in writing to the editorial office.

**Presubmission Inquiries**

It is the policy of the editors to not respond to pre-submission inquiries for original research articles. The Authors should submit their manuscripts for formal peer review after following all of the guidelines listed in these Instructions to Authors.

In some instances, the associate editor may reach out to a second reviewer (generally an assistant editor or invited reviewer with topic-related expertise) for a triage review. It is anticipated that approximately 50% of the submitted manuscripts will undergo formal review and 50% will be rejected without evaluation by external reviewers. This policy reflects the stringent requirements for the acceptance of manuscripts submitted to *Stroke.*

### Cover Letter

Please upload a cover letter that includes the following statement: “All authors have read and approved the submitted manuscript, the manuscript has not been submitted elsewhere nor published elsewhere in whole or in part, except as an abstract (if relevant).” Manuscripts should conform to "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (N Engl J Med. 1991; 324:424-428).

The authors may include the names of up to 3 reviewers whom they do **not** want to evaluate their submission. The editor ultimately decides who reviews the manuscript. Lastly, please note any potential overlapping content submitted or accepted to another journal or conference.

### How to Submit to an AHA Journal

Manuscripts must be submitted online. Before proceeding to online submission, please prepare your manuscript according to the instructions below. The instructions below are meant to be a submission process guide.

**We will consider initial Original Research Article submissions that are not formatted according to journal standards.** However, the initial Original Research Article submission must include a complete list of authors in the online submission portal and include all submission files necessary for review. Submissions to other article categories should meet the specified number of words, references, and figures/tables of that category upon initial submission.

**Manuscripts that are revised or ultimately accepted will be required to be formatted by the authors according to specific journal requirements (ie, title page, abstract, references, tables and figures, and disclosures).** At that stage, please refer to the journal's Revised & Accepted Manuscripts instructions.

Prior to submission, please gather the following items:

A single PDF including all elements including text, figures, and tables

Alternately, individual Manuscript files can be provided:

Manuscript text file.

Tables: May be either embedded within the manuscript (preferred) or submitted as separate files. Tables should be provided as editable text, not as images.

Figures: May be either embedded within the manuscript (preferred) or submitted separately. Please note that only PDF, EPS, and TIFF files will be allowed for publication, but any sufficiently clear image format is acceptable for initial submission.

Supplemental Files

All author information, including:

Full names

Affiliations

E-mail addresses

**Submission Process**

There are four steps in the manuscript submission process: Upload Files, Manuscript Info, Review Material, and Submit. The steps and sub-steps can be navigated via the menu on the left side of the page. All information will be saved automatically as you progress. During submission, you may return to any step or sub-step at any time. A general outline of the steps follows although individual journals may request additional info.

**Upload Files**

Use the “Browse” button to locate the files or drag and drop the files into the upload interface. The manuscript, figures, and table files will be merged into a combined PDF.

For each file, use the dropdown menu to select the appropriate file type.

Some file types, eg, Figures and Supplemental Material, require a brief description of the file’s content.

If necessary, use the “Move” button to drag and drop the files into the correct order.

**Manuscript Info**

Authors:

Please enter the first and last name of each author and click the “Find User” button next to the name. Alternately, enter the author’s email address and click “Find User By Email”. This will allow you to find the author’s account in the online system.

For any authors not already in the online system, please enter all fields marked with an asterisk (*)

Be sure to order authors as they are listed on the title page.

Title and Abstract

Preprint Server: Indicate if a version of the manuscript has been posted to a community preprint server.

Short In Vivo Checklist (Preclinical Animal Testing): If the manuscript includes research on animals, you will be asked to complete a short checklist.

Author Reviewer Suggestions/Exclusions: If desired, you may suggest individuals to be invited as reviewers, or suggest individuals who you would prefer to exclude from the review process. Please note, that the editors will make the ultimate decision regarding review.

Clinical Trial Registration: All clinical trials should have been registered prior to patient enrollment. If your manuscript is considered a clinical trial per the ICMJE definition but has not been registered, it will not be considered for publication in the journal. You will be asked to provide the URL and identification number for the trial registration.

**Review Materials**

Review Manuscript Files: Please open each file to confirm that the file has correctly converted to PDF.

Review Manuscript Data: Please review and approve the manuscript information entered during the submission process.

**Submit:** Click “Approve Submission” to finalize.

**Review Articles**

**Reviews:** This category presents a review of advances related to important research and clinical topics relevant to some aspect of cerebrovascular disease. Reviews will generally be invited by the editors but unsolicited reviews will also be considered. Both invited and unsolicited review articles will undergo peer review.

Maximum length: ≤8,000 words
The 8,000 word limit includes the title page, unstructured abstract, text, acknowledgments, sources of funding, disclosures, references, figure legends, tables and appendices (like nonauthor collaborators) intended for publication in the main article.

Maximum number of figures and tables: 6
Each figure may contain up to 6 panels (parts A to F)

Please provide a key figure that summarizes the take home message in a visual way.

**Focused Updates:** These consist of a group of 4 to 6 invited review articles concerning a specific topic organized by a lead author.

**Emerging Therapy Critiques:** Short, invited commentaries on important clinical trials. Critiques are succinct, timely and are limited to 2500 words inclusive of the title page, unstructured abstract, text, references, tables and figure legends.

**Manuscript Preparation**

When a manuscript is ready for submission, please proceed to the manuscript submission site.

Those manuscripts that are revised or ultimately accepted will be required to be formatted by the authors according to specific journal requirements as detailed on the journal's Revised & Accepted Manuscripts instructions.

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**Initial submission of Original Research Manuscripts will be considered for review if they meet the format-free Minimum Submission Requirements.**

All journals in the American Heart Association [AHA] portfolio adhere to a common set of author instructions which are available as AHA Journals Submission Requirements. Authors are encouraged to review AHA Journals submission requirements in their entirety and specific journal requirements (listed below) prior to initial submission, however, Original Research manuscripts will only be returned to authors if they fail to meet the format-free Minimum Submission Requirements.

Submissions in article categories other than Original Research Article should meet the specified number of words, references, and figures/tables of that category upon initial submission. See Article Types for details.

*Stroke* Specific Requests

Authors are encouraged to include the following items when submitting an Original Research manuscript.

**Graphic Abstract:** The intent is to provide readers with a succinct summary of the study, emphasizing new findings, in a form that facilitates its dissemination in presentations. It may be submitted at any time, but is required at revision submission. Format requirements are:

single figure panel

image no more than 18 cm (7 inches) square

12 point san serif font

all content should be graphical (do not include data items)

a legend of no more than 50-100 words is optional

JPG file format

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Title Page

Please refer to the instructions for Title Page as listed in the AHA Journals Submission Requirements as needed.

Additionally, please note the following *Stroke* specific guidelines.

**Optional:** Stroke posts about its published articles on Facebook and Twitter. If you would like us to include an author or department social media handle in our posts, please provide it on the title page.

Abstract and Key Words

**REQUIREMENT:** The Abstract must be organized into the following four sections:

**Background:** description of the rationale for the study

**Methods:** state study design; brief description of methods

**Results:** presentation of significant results

**Conclusions:** interpretation and significance of the observations, emphasizing new information

When applicable, clinical trial **Registration** information should be included at the end of the Abstract with the URL and Unique Identifier for the publicly accessible website on which the trial is registered.

Please refer to the instructions for abstracts as listed in the AHA Journal Submission Requirements. **NEW:** Read the Top 10 recommendations to improve abstracts. Additionally, please note the following *Stroke* specific guidelines.

Abstract length is limited to 300 words.

Methods

Please refer to the instructions for Methods as listed in the AHA Journals Submission Requirements.

To ensure the publication of high-quality research that upholds accepted standards of methodological rigor, reproducibility, and transparency, please refer to the **AHA Journals Research Guidelines** as needed for information on research reporting guidelines and guidelines for clinical research and trials, animal research, data deposition and availability, and research methods and materials availability, along with other recommendations. Authors are also encouraged to review the **Statistical Reporting Recommendations** developed by the AHA Scientific Publishing Committee Statistics Task Force for encouraging reproducibility, rigor, interpretability, and transparency through improved statistical reporting.

Additionally, please note the following *Stroke* specific guidelines.

**State and cite in the Methods which reporting guideline was followed.**

**Reporting Guidelines:** The reporting guidelines described in AHA Journals Research Guidelines are REQUIRED. Please upload a completed copy of the relevant checklist as part of the Supplemental Material PDF during submission. **Be sure to use the manuscript continuous line numbers in the completed checklist. This will speed review.** If accepted for publication, uploaded Checklists will be included as supplemental material in the published article.

**NEW:** Authors submitting revisions of manuscripts reporting **Machine Learning Predictive Models** should submit a completed reporting checklist with their revised files [Word Doc link]. This checklist is optional at initial submission and required at revision submission.

**Reporting Guideline Translations:** Most reporting guidelines provide translated versions in multiple languages (including Spanish, Chinese, Portuguese, and others) to help authors who are more comfortable working in languages other than English. Authors are encouraged to use the guideline in their preferred language when preparing their research and manuscripts; however, please note that checklists submitted to the journal must be in English. Translations are available for the following common guidelines: CONSORT; STROBE; PRISMA; TRIPOD; ARRIVE

**Preclinical Testing Therapies Checklists:** Upon submission of revised manuscripts, authors reporting preclinical work will need to complete a checklist aimed at enhancing rigor, transparency, and reproducibility. Authors are asked to include the corresponding information in the Methods text or in an online supplement. Items requested include:

**Animals:** Species, strains and sources must be defined. For genetically modified animals, wildtype controls including background and back-crossing must be defined.

**Statistics and sample size:** Specific statistical methods must be defined, including parametric versus nonparametric and multigroup analyses, and sample size powering based on expected variances and differences between groups.

**Inclusions and exclusions:** Specific criteria for inclusions and exclusions must be specified. For example, only animals where blood flow reductions fall below a certain threshold are included. Or only animals with a certain degree of neurological deficits are included. Once animals are randomized (see below), all excluded animals must be reported, including explicit presentation of mortality rates.

**Randomization, allocation concealment and blinding:** All animals must be randomized. Investigators responsible for surgical procedures or drug treatments must be blinded. End point assessments must be performed by investigators blinded to the groups for which each animal is assigned.

Figure Guidelines

For additional information on preparing figures, please see the AHA Journal Figure Guidelines; for revisions and/or accepted manuscripts, please see Revised & Accepted Manuscripts.

Additionally, please note the following *Stroke* specific guidelines.

**Maximum allowed:** the combined total number of figures and tables is limited to 6 (3 for Brief Reports). Each figure may contain up to 6 panels (e.g., parts A to F).

Supplemental Material

**REQUIREMENT:** Supplemental material is included in peer review and must be submitted simultaneously with the original manuscript submission. Supplemental materials may include the following items in the order listed:

Detailed Methods (PDF file format)

Supplemental Figures and Figure Legends (PDF file format)

Supplemental Tables and supporting information (PDF file format)

Supplemental References (PDF file format)

Legends for Video files (PDF file format)

Video Files (acceptable file formats are: avi, mov, mpg at max 10 MB; if larger, create and upload zip file)

For additional information on preparing supplemental material, please see the AHA Journal Submission Requirements.

**Manuscript Submission Requirements**

The following minimum submission requirements have been developed for the full AHA/ASA journal portfolio. Please review the guidelines carefully as manuscripts that do not adhere to the submission requirements may be returned to the authors. Our goal in developing these guidelines is to reduce the burden on authors of extensive reformatting while ensuring that manuscripts are complete and relatively uniform to allow for consistent and thorough review by editors and reviewers.

**Online submission is required for all AHA/ASA journals.** A full list of all 12 journal submission sites and links to individual journal authors instructions is available here.

***New:*** The AHA Journals now offer two-way integration with our manuscript submission system and the preprint servers **BioRxiv** and **MedRxiv**. To find out more how authors can take advantage of this service to allow research to be shared freely, immediately, and on a trusted platform prior to peer review, visit ahajournals.org/preprints.

**Minimum Submission Requirements**

**We will consider initial Original Research Article submissions that are not formatted according to AHA Journal standards.** Detailed submission guidelines, including word and display item limits by article type, can be found in individual journal Author Instructions; however, Original Research manuscripts will only be returned to authors if they do not meet the following format-free Minimum Submission Requirements:

**Provide all files needed for review**: Full Manuscript PDF or the following individual files: Manuscript Text File, Figures, & Supplemental Material.

**Assemble the manuscript in this order:** Title Page, Abstract, Text (Introduction, Methods, Results, Discussion), Acknowledgments, Sources of Funding, Disclosures, References, Figure Legends, Tables, and Figures. As an aid to reviewers, please number every page except the title page.

**References, figures, and tables** should be cited in numerical order according to first mention in the text.

**Guidelines & Policies:** Please familiarize yourself with the AHA guidelines and policies prior to submission: AHA/ASA Journal Policies. In addition, manuscripts must conform to "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (http://www.icmje.org).

Additional details have been provided below for reference, as needed.

**Submission Files**

Please provide the following items with submission:

**Full Manuscript PDF:** PDF containing all parts of the manuscript including references, legends, figures and tables.

**Manuscript Text File:** For word count and reference extraction, please provide a manuscript text file (eg, MS Word)

**Figures:** For initial review, it is preferred that each figure and its corresponding legend should be presented together on its own page within the full PDF. Full resolution figure files are not required at initial submission; figures for review can be uploaded as a single PDF or as part of a complete manuscript PDF.

**Supplemental Material:** Supplements should be uploaded as a complete PDF file containing all supplemental text and figures; video files and large datasets in Excel file format can be uploaded separately. Videos must be provided in a filetype that is playable on both PC and Mac computers. We recommend the use of MP4 video files (.mp4, .m4v, .mp4v extensions) or the .mov filetype.

If applicable, any overlapping publications or previously published abstracts, along with a copy of any submitted or in press references mentioned in the manuscript.

**Manuscript Preparation Guidelines**

The following are additional manuscript preparation guidelines for the AHA/ASA journal portfolio. Please note that these guidelines are provided as an aid and authors that adhere to the Minimum Submission Requirements provided above will have their manuscript considered for review.

Organize manuscripts in this order:

Title Page

Abstract

Introduction

Methods

Results

Discussion

Acknowledgments

Sources of Funding

Disclosures

References

Tables

Figures with Figure Legends

Number all pages—including Figures with legends and Tables. Abbreviations must be defined at first mention.

It is recommended for manuscripts to be typed, double-spaced using a 12-point font, including references, figure legends, and tables. Leave 1-inch margins on all sides.

**Title Page**

The first page of the manuscript (title page) should contain these elements:

Full title

Authors' names, academic degrees, and affiliations

Author names can also include the native language along with the English version. Use standard Microsoft fonts for these characters

Short title (not to exceed 50 characters, including spaces)

Name, email address, and complete address of corresponding author

The total word count of the manuscript (including Title Page, Abstract, Text, References, Tables and Figures Legends)

## Author Information

**Authorship Criteria and Responsibilities:** The AHA Journals follow the recommendations of the ICMJE on authorship and contributorship. Credit for authorship requires substantial contributions to: conception and design, or acquisition of data, or analysis and interpretation of data; drafting the manuscript or revising it critically for important intellectual content; and final approval of the version to be published. Prior to publication, authors will need to attest that they fulfil the authorship criteria and identify their contributions to the work described in the manuscript.

If a revision is requested, all authors must complete an Author Conflict of Interest Disclosure Questionnaire and Copyright Transfer or License Agreement prior to acceptance and publication. As of May 2021, all AHA Journals use Convey to facilitate the disclosure process; for more information, please review the support page on Conflict of Interest Disclosures for Authors. If an author dies prior to completing these forms, a policy has been developed to address how to handle potential issues and is available online.

One author should be designated as the corresponding author for the submission, peer review, and production process, and they will be identified as such in the published article.

***New:*** The use of automated assistive writing technologies and tools (commonly referred to as artificial intelligence or machine learning tools) is permitted provided that their use is documented and authors assume responsibility for the content. As with human-generated content, authors are responsible for the accuracy, validity, and originality of computer-generated content. Per ICMJE Authorship Criteria, automated assistive writing technologies do not qualify for authorship as they are unable to provide approval or consent for submission. Per ICMJE recommendations for writing assistance, these tools should be listed in the Acknowledgements; if involved in the research design, the tools should be documented in the Methods. For additional information, see the World Association of Medical Editor recommendations.

**Name Change Policy:** AHA/ASA Journals will consider name change requests without requiring a correction notice for reasons including, but not limited to, gender identity, marriage, divorce, and religious conversion. For more information and instructions for submitting a request, please visit the AHA/ASA Journal Name Change Policy page.

**ORCiD:** All corresponding authors of articles accepted to AHA Journals will be required to link an **ORCID iD** to their profile in the AHA Journal submission system prior to publication.

ORCID (Open Researcher and Contributor Identifier) is an international, not-for-profit organization created for the benefit of researchers, research organizations, funders, and publishers. An ORCID iD is a 16-digit persistent digital identifier that distinguishes you from every other researcher. The AHA Journals will join other journal portfolios and grant funders (including the AHA and NIH) in enacting this requirement, which will disambiguate authors and will help authors maintain a persistent record of their publications.

To register with ORCID or link your profile to your ORCID iD, please go to “Modify Profile/Password” on the submission site homepage of any AHA Journal, and click the link in the “ORCID” section. We encourage all authors to create and/or link their ORCID iD to their profile.

Any collaborators who need to be indexed in PubMed should be listed either as authors or, for author/study groups, in the main manuscript file in an Appendix Section. Include the Appendix section immediately before the Reference section and include only names of authors listed in the byline or names of group or committee members where the group or committee is listed in the byline. The Appendix section should contain the names of such individuals only; no contact information should be provided. If contributors do not need to be listed as authors or indexed in PubMed, then they may be included in the PDF Supplemental Material File. To confirm, any author/study groups listed in Supplemental Material will not be indexed in PubMed.

### Abstract

***New:*** Top 10 Recommendations to Improve Abstracts. These 10 recommendations are designed to help authors improve the utility and uniformity of abstracts being submitted AHA Journals.

Do not cite references in the abstract.

Limit use of acronyms and abbreviations. Define at first use with acronym or abbreviation in parentheses.

When applicable, Clinical Trial Registration information should be included at the end of the Abstract with the URL and Unique Identifier, for the publicly accessible website on which the trial is registered.

Please see individual journal author instructions for specific abstract requirements.

### Abbreviations

Please create a list of nonstandard abbreviations and nonstandard acronyms used in the manuscript text. The list should be included in the manuscript and placed after the abstract, before the Introduction. The list should be entitled "Non-standard Abbreviations and Acronyms." Its content will not count toward the word limit. ***AHA Journals*** follow AMA style for standard and non-standard abbreviations and acronyms (http://www.amamanualofstyle.com). All abbreviations and acronyms should be expanded upon first use in the text, and thereafter the abbreviation/acronym should be used.

### Methods

The methods section should provide sufficient detail for the experiments to be reproduced and should provide sufficient information for the reader to understand the basic methods of the study and to review the fundamental findings in a mechanistic way; as needed, additional methods and information may be included as Supplemental Material. Please refer to the AHA Journals Research Guidelines for additional guidance as needed.

The following information should be included as appropriate:

**Use SI units of measure**. A more conventionally used measurement may follow in parentheses. Make all conversions before manuscript submission.

**Statistics:** A subsection on statistics should be included in the Methods section and the measures of variance, such as standard deviation or standard error, should be indicated. Please refer to the AHA Statistical Reporting Recommendations for additional information.

**Experimental animals:** State the species, strain, number used, and pertinent descriptive characteristics. All studies in animals should be conducted in accordance with the National Institutes of Health (NIH) Guide for the Care and Use of Laboratory Animals, or the equivalent. When describing surgical procedures, identify the preanesthetic and anesthetic agents used and the amounts, concentrations, routes, and frequency of administration of each. Paralytic agents are not considered acceptable substitutes for anesthetics. For other invasive procedures on animals, report the analgesic or tranquilizing drug used. If none were used, provide justification for exclusion.

In experiments involving genetically engineered mice, inbred strain background effects have become an important concern. Detailed descriptions of the source and strain background are critical to the interpretation of data from genetically manipulated mice. The description of the mice must include the number of backcrosses and the source of the mice. Stock numbers should be supplied for commercial suppliers. Imprecise descriptions such as "mice are on a C57BL/6 background" are not acceptable. In general, it is preferable for genetically manipulated mice to be compared to wild-type littermates.

**Human studies:** Indicate that the study was approved by an institutional review board along with the name of the IRB, and that the participants gave written informed consent (or that no informed consent was required). Describe the characteristics of human subjects or patients and indicate that the procedures followed were in accordance with institutional guidelines.

As noted in AHA Journals Research Guidelines, please provide sex-specific and/or race/ethnicity-specific data when appropriate in describing the outcomes of epidemiologic analyses or clinical trials, or specifically state that no sex-based or race/ethnicity-based differences were present.

Authors submitting scientific manuscripts that primarily focus on reporting health differences by race and/or ethnicity should follow the Disparities Research Guidelines. For additional context, please see “The Groundwater of Racial and Ethnic Disparities Research. A Statement from Circulation: Cardiovascular Quality & Outcomes.”

**Independent data access and analysis:** As noted in AHA Journals Research Guidelines, a specific comment in the manuscript is required attesting that one author had full access to all the data in the study and takes responsibility for its integrity and the data analysis. The Editors reserve the right to ask for additional information from the corresponding author regarding measures that were taken to minimize bias and verify the integrity of the primary data and any analyses performed.

**Studies of medications, biologics and devices:** Generic rather than trademark names of all therapeutics should be used.

**Materials and Data Availability:** Please ensure that your manuscript adheres to the AHA Journals' implementation of the Transparency and Openness Promotion (TOP) Guidelines.

**Acknowledgments, Sources of Funding, & Disclosures**

The following should be formatted as three distinct sections:

a) **Acknowledgments:** This area is to acknowledge contributions to the manuscript. All persons acknowledged must have seen and approved mention of their names in the article, as readers may infer their endorsement of data and conclusions; as such, acknowledged individuals must provide written (email) acknowledgment of their agreement to be included before acceptance. Emails from persons acknowledged can be forwarded to the editorial office or sent directly from the person. Please ensure the manuscript number is included in all correspondence.

b) **Sources of Funding:** State funding that supported the studies. Please include all sources of research support, including public and private entities, commercial or institutional support, and any substantial contributions by individuals. All grant funding agency abbreviations should be completely spelled out, with the exception of NIH.

c) **Disclosures:** All actual or potential perceived conflicts of interests should be stated as outlined in the AHA’s Conflict of Interest Procedures. If authors have nothing to disclose, they must state "None".

**References**

AHA Journals use a numbered endnote style for references (examples below), which should be cited in numerical order according to first mention in the text, including Figure and Table legends, followed by references that are cited in the Supplemental Material only. When possible, list any reference cited in a table or figure legend in the reference list according to where the table or figure is cited in the text.

**NEW:** Supplementary Materials should not include a separate reference list and all citations in the Supplemental Materials should be included in the main reference list.

Accuracy of reference data is the responsibility of the author.

Abstracts may be cited only if they are the sole source and must be identified in the reference as "Abstract."

Reference citations should be to the most recent full-length publication in a peer-reviewed journal, when applicable.

Personal communications, unpublished observations, and submitted manuscripts must be cited in the text only (not in the reference list) as follows: author name, degree(s) held, unpublished data, year.

References to retracted or potentially problematic sources without proper context should be avoided.

Manuscripts posted to a preprint server may be cited only if they are the sole source and must be identified in the reference as “Preprint.” If a peer-reviewed version of the article is available, authors should consult that version and the reference should be updated to cite the final published version when appropriate.

"In-press" citations must be accepted for publication and must include the name of the journal or book publisher. Note that all such articles must be uploaded online with the manuscript submission.

List the first 10 author names, followed by “et al.”

AHA/ASA style is available for download on endnote.com. The style applicable to all AHA Journals may be found listed under ***Stroke***. The download link is: https://endnote.com/style_download/stroke/

Example of journal reference style: Smith VA, Zhang J, Jones K. Article Title. *Journal Name*. 2015;100:555–559.

### Figures

For initial review, it is preferred (but not required) that each figure and its corresponding legend should be presented together on its own page within the manuscript PDF, if possible. Full resolution figure files are not required at initial submission; figures for review can be uploaded as a single PDF or part of a complete manuscript PDF. For additional information on preparing figures for revisions and/or accepted manuscripts, please refer to individual journal author instructions and the AHA Journals Figure Guidelines.

In general, authors should adhere to the following guidelines when preparing their figures:

Figure parts should be clearly labeled. Letters and locants must be uniform in size and style within each figure, and when possible, between figures. (The font size must be 10 point or higher.) Avoid headings on the figure; heading information should appear in the figure legend.

Limit white space between the panel and panel label.

Symbols and abbreviations must be defined in the figure or its legend.

Linear adjustment of contrast, brightness or color must be applied equally to all parts of an image.

Blots and gels need to be presented with a much context as possible (ie, panels should not to be cut up into individual blots).

Supply a scale bar with photomicrographs.

Authors must be prepared to submit the original, unaltered files from which the submitted figures were derived, if requested by the editorial office.

**Tables**

All table(s) in the main manuscript document should be included as text, not as an image. Table(s) are counted in the word limit.

Number tables using Arabic numerals, and supply a brief, informative title for each table.

Table text must be consistent in size and style with main manuscript text.

Supply brief column headings.

Use only horizontal borders above and below the column headings and at the bottom of the table. Use extra space to delineate rows and columns.

Sub-tables or table parts (eg, Table 1a, Table 1b, etc) are not permitted.

Do not use color or shading to convey meaning in table text or cells.

Indicate footnotes in this order: *, †, ‡, §, ||, #, **

Abbreviations used in the table must be defined in a footnote to the table.

**Supplemental Material**

Supplemental Material must be submitted at the time of original manuscript submission.

All original Supplemental Material should be provided as a combined PDF labeled accordingly. Please note that this single PDF would include all of the supplemental material related to your manuscript, except for file types that cannot be converted to PDF such as video files or large data sets. Videos must be provided in a filetype that is playable on most devices, including PC and Mac computers and mobile. We recommend the use of MP4 video files (.mp4, .m4v, .mp4v extensions) or the .mov filetype.

Supplemental Materials should not include a separate reference list and all citations in the Supplemental Materials should be included in the main reference list.

In the manuscript text, following the Acknowledgments, Sources of Funding, & Disclosures section, please include a list of the supplemental materials with a callout to any references that are in the Supplemental Material only, for example:

**Supplemental Material**
Supplemental Methods
Tables S1–S3
Figure S1
Videos S1–S4
Data Set
Major Resources Table
References #–#

Additional supplemental material provided for review only, such as any overlapping publications, previously published abstracts, and submitted or in press references mentioned in the manuscript, should be provided a separate PDFs.

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Manuscript formatting: Format your manuscript to your chosen journal’s guidelines.

Figure illustration: Turn your ideas into quality figures and illustrations for your article.

Figure formatting: Ensure your figures meet the artwork guidelines of your chosen journal.

Graphical abstract design: Draw readers to your research story with a visually engaging and scientifically precise graphical abstract.

## Appendix B – PRISMA 2020 Abstract Checklist & Checklist

### PRISMA 2020 Abstract Checklist

| Section and Topic | Item # | Checklist item | Reported (Yes/No) |
|---|---|---|---|
| **TITLE** | | | |
| Title | 1 | Identify the report as a systematic review. | Yes |
| **BACKGROUND** | | | |
| Objectives | 2 | Provide an explicit statement of the main objective(s) or question(s) the review addresses. | Yes |
| **METHODS** | | | |
| Eligibility criteria | 3 | Specify the inclusion and exclusion criteria for the review. | Yes |
| Information sources | 4 | Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched. | Yes |
| Risk of bias | 5 | Specify the methods used to assess risk of bias in the included studies. | Yes |
| Synthesis of results | 6 | Specify the methods used to present and synthesise results. | Yes |
| **RESULTS** | | | |
| Included studies | 7 | Give the total number of included studies and participants and summarise relevant characteristics of studies. | Yes |
| Synthesis of results | 8 | Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (e.g. which group is favoured). | Yes |
| **DISCUSSION** | | | |
| Limitations of evidence | 9 | Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision). | Yes |
| Interpretation | 10 | Provide a general interpretation of the results and important implications. | Yes |
| **OTHER** | | | |
| Funding | 11 | Specify the primary source of funding for the review. | No |
| Registration | 12 | Provide the register name and registration number. | No |

PRISMA 2020 Checklist

| Section and Topic | Item # | Checklist item | Location where item is reported |
|---|---|---|---|
| **TITLE** | | | |
| Title | 1 | Identify the report as a systematic review. | 21 |
| **ABSTRACT** | | | |
| Abstract | 2 | See the PRISMA 2020 for Abstracts checklist. | 188 |
| **INTRODUCTION** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of existing knowledge. | 25 |
| Objectives | 4 | Provide an explicit statement of the objective(s) or question(s) the review addresses. | 25 |
| **METHODS** | | | |
| Eligibility criteria | 5 | Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses. | 26 |
| Information sources | 6 | Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted. | 26 |
| Search strategy | 7 | Present the full search strategies for all databases, registers and websites, including any filters and limits used. | 193 |
| Selection process | 8 | Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process. | 26 |
| Data collection process | 9 | Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process. | 26 & 27 |
| Data items | 10a | List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect. | 26 & 27 |
| | 10b | List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information. | 26 & 27 |

| Section and Topic | Item # | Checklist item | Location where item is reported |
|---|---|---|---|
| Study risk of bias assessment | 11 | Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process. | 27 |
| Effect measures | 12 | Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results. | N/A |
| Synthesis methods | 13a | Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)). | 27 |
| | 13b | Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions. | 27 |
| | 13c | Describe any methods used to tabulate or visually display results of individual studies and syntheses. | N/A |
| | 13d | Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used. | 27 |
| | 13e | Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression). | N/A |
| | 13f | Describe any sensitivity analyses conducted to assess robustness of the synthesized results. | N/A |
| Reporting bias assessment | 14 | Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases). | N/A |
| Certainty assessment | 15 | Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome. | N/A |
| **RESULTS** | | | |
| Study selection | 16a | Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram. | 28 |
| | 16b | Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded. | 28 & 29 |

| Section and Topic | Item # | Checklist item | Location where item is reported |
|---|---|---|---|
| Study characteristics | 17 | Cite each included study and present its characteristics. | 33 – 40 |
| Risk of bias in studies | 18 | Present assessments of risk of bias for each included study. | 30 – 32 |
| Results of individual studies | 19 | For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots. | N/A |
| Results of syntheses | 20a | For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies. | 29 & 33 |
| | 20b | Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect. | N/A |
| | 20c | Present results of all investigations of possible causes of heterogeneity among study results. | N/A |
| | 20d | Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results. | N/A |
| Reporting biases | 21 | Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed. | N/A |
| Certainty of evidence | 22 | Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed. | N/A |
| **DISCUSSION** | | | |
| Discussion | 23a | Provide a general interpretation of the results in the context of other evidence. | 43 – 46 |
| | 23b | Discuss any limitations of the evidence included in the review. | 45 & 46 |
| | 23c | Discuss any limitations of the review processes used. | 45 & 56 |
| | 23d | Discuss implications of the results for practice, policy, and future research. | 46 |
| **OTHER INFORMATION** | | | |
| Registration and protocol | 24a | Provide registration information for the review, including register name and registration number, or state that the review was not registered. | 26 |

| **Section and Topic** | **Item #** | **Checklist item** | **Location where item is reported** |
|---|---|---|---|
| | 24b | Indicate where the review protocol can be accessed, or state that a protocol was not prepared. | N/A |
| | 24c | Describe and explain any amendments to information provided at registration or in the protocol. | N/A |
| Support | 25 | Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review. | N/A |
| Competing interests | 26 | Declare any competing interests of review authors. | N/A |
| Availability of data, code and other materials | 27 | Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review. | Risk of bias tool: 198 |

*From:* Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: http://www.prisma-statement.org/

## Appendix C – Search Strategy

(“Suicide” OR “Self-murder”) AND (“after” OR “post” OR “following”) AND ((“Stroke”) OR (“poststroke”) OR (“cerebrovascular accident”) OR (“CVA”) OR (“cerebrovascular stroke”) OR (“thrombosis”))

The same search terms were used for all database searches.

Appendix D – Quality Appraisal Tool (Newcastle-Ottawa Scale)

# NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE CASE CONTROL STUDIES

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Exposure categories. A maximum of two stars can be given for Comparability.

**Selection**

1) Is the case definition adequate?

a) yes, with independent validation *

b) yes, eg record linkage or based on self reports

c) no description

2) Representativeness of the cases

a) consecutive or obviously representative series of cases *

b) potential for selection biases or not stated

3) Selection of Controls

a) community controls *

b) hospital controls

c) no description

4) Definition of Controls

a) no history of disease (endpoint) *

b) no description of source

**Comparability**

1) Comparability of cases and controls on the basis of the design or analysis

a) study controls for _______________ (Select the most important factor.) *

b) study controls for any additional factor * (This criteria could be modified to indicate specific control for a second important factor.)

**Exposure**

1) Ascertainment of exposure

a) secure record (eg surgical records) *

b) structured interview where blind to case/control status *

c) interview not blinded to case/control status

d) written self report or medical record only

e) no description

2) Same method of ascertainment for cases and controls

a) yes *

b) no

3) Non-Response rate

a) same rate for both groups *

b) non respondents described

c) rate different and no designation

## NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE

## COHORT STUDIES

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability

**Selection**

1) Representativeness of the exposed cohort

a) truly representative of the average _______________ (describe) in the community *

b) somewhat representative of the average ______________ in the community *

c) selected group of users eg nurses, volunteers

d) no description of the derivation of the cohort

2) Selection of the non exposed cohort

a) drawn from the same community as the exposed cohort *

b) drawn from a different source

c) no description of the derivation of the non exposed cohort

3) Ascertainment of exposure

a) secure record (eg surgical records) *

b) structured interview *

c) written self report

d) no description

4) Demonstration that outcome of interest was not present at start of study

a) yes *

b) no

**Comparability**

1) Comparability of cohorts on the basis of the design or analysis

a) study controls for _____________ (select the most important factor) *

b) study controls for any additional factor * (This criteria could be modified to indicate specific control for a second important factor.)

**Outcome**

1) Assessment of outcome

a) independent blind assessment *

b) record linkage *

c) self report

d) no description

2) Was follow-up long enough for outcomes to occur

a) yes (select an adequate follow up period for outcome of interest) *

b) no

3) Adequacy of follow up of cohorts

a) complete follow up - all subjects accounted for *

b) subjects lost to follow up unlikely to introduce bias - small number lost - % (select an adequate %) follow up, or description provided of those lost *

c) follow up rate < -% (select an adequate %) and no description of those lost

d) no statement

# NEWCASTLE – OTTAWA CODING MANUAL FOR CASE-CONTROL STUDIES

## SELECTION

### 1) Is the Case Definition Adequate?

a) Requires some independent validation (e.g. >1 person/record/time/process to extract information, or reference to primary record source such as x-rays or medical/hospital records) *

b) Record linkage (e.g. ICD codes in database) or self-report with no reference to primary record

c) No description

### 2) Representativeness of the Cases

a) All eligible cases with outcome of interest over a defined period of time, all cases in a defined catchment area, all cases in a defined hospital or clinic, group of hospitals, health maintenance organisation, or an appropriate sample of those cases (e.g. random sample) *

b) Not satisfying requirements in part (a), or not stated

### 3) Selection of Controls

This item assesses whether the control series used in the study is derived from the same population as the cases and essentially would have been cases had the outcome been present.

a) Community controls (e.g. same community as cases and would be cases if had outcome) *

b) Hospital controls, within same community as cases (e.g. not another city) but derived from a hospitalised population

c) No description

### 4) Definition of Controls

a) If cases are first occurrence of outcome, then it must explicitly state that controls have no history of this outcome. If cases have new (not necessarily first) occurrence of outcome, then controls with previous occurrences of outcome of interest should not be excluded. *

b) No mention of history of outcome

## COMPARABILITY

### 1) Comparability of Cases and Controls on the Basis of the Design or Analysis

A maximum of 2 stars can be allotted in this category Either cases and controls must be matched in the design and/or confounders must be adjusted for in the analysis. Statements of no differences between groups or that differences were not statistically significant are not sufficient for establishing comparability. Note: If the odds ratio for the exposure of interest is adjusted for the confounders listed, then the groups will be considered to be comparable on each variable used in the adjustment.

There may be multiple ratings for this item for different categories of exposure (e.g. ever vs. never, current vs. previous or never)

Age = *, Other controlled factors = *

## EXPOSURE

### 1) Ascertainment of Exposure

Allocation of stars as per rating sheet

### 2) Non-Response Rate

Allocation of stars as per rating sheet

# NEWCASTLE – OTTAWA CODING MANUAL FOR COHORT STUDIES

## SELECTION

### 1) Representativeness of the Exposed Cohort

Item is assessing the representativeness of exposed individuals in the community, not the representativeness of the sample of women from some general population. For example, subjects derived from groups likely to contain middle class, better educated, health oriented women are likely to be representative of postmenopausal estrogen users while they are not representative of all women (e.g. members of a health maintenance organisation (HMO) will be a representative sample of estrogen users. While the HMO may have an under-representation of ethnic groups, the poor, and poorly educated, these excluded groups are not the predominant users users of estrogen).

Allocation of stars as per rating sheet

### 2) Selection of the Non-Exposed Cohort

Allocation of stars as per rating sheet

### 3) Ascertainment of Exposure

Allocation of stars as per rating sheet

### 4) Demonstration That Outcome of Interest Was Not Present at Start of Study

In the case of mortality studies, outcome of interest is still the presence of a disease/ incident, rather than death. That is to say that a statement of no history of disease or incident earns a star.

## COMPARABILITY

### 1) Comparability of Cohorts on the Basis of the Design or Analysis

A maximum of 2 stars can be allotted in this category Either exposed and non-exposed individuals must be matched in the design and/or confounders must be adjusted for in the analysis. Statements of no differences between groups or that differences were not statistically significant are not sufficient for establishing comparability. Note: If the relative risk for the exposure of interest is adjusted for the confounders listed, then the groups will be considered to be comparable on each variable used in the adjustment.

There may be multiple ratings for this item for different categories of exposure (e.g. ever vs. never, current vs. previous or never)

Age = *, Other controlled factors = *

## OUTCOME

### 1) Assessment of Outcome

For some outcomes (e.g. fractured hip), reference to the medical record is sufficient to satisfy the requirement for confirmation of the fracture. This would not be adequate for vertebral fracture outcomes where reference to x-rays would be required.

a) Independent or blind assessment stated in the paper, or confirmation of the outcome by reference to secure records (x-rays, medical records, etc.) *

b) Record linkage (e.g. identified through ICD codes on database records) *

c) Self-report (e.g. no reference to original medical records or x-rays to confirm the outcome)

d) No description

### 2) Was Follow-Up Long Enough for Outcomes to Occur

An acceptable length of time should be decided before quality assessment begins (e.g. 5 yrs. for exposure to breast implants)

### 3) Adequacy of Follow Up of Cohorts

This item assesses the follow-up of the exposed and non-exposed cohorts to ensure that losses are not related to either the exposure or the outcome.

Allocation of stars as per rating sheet

Appendix E – Aphasiology Journal Requirements

Instructions for authors

Thank you for choosing to submit your paper to us. These instructions will ensure we have everything required so your paper can move through peer review, production and publication smoothly. Please take the time to read and follow them as closely as possible, as doing so will ensure your paper matches the journal’s requirements.

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Aphasiology accepts the following types of article: review articles; research reports; study protocols; clinical forums; research notes. If your article does not fit in any of these categories, please contact the editor in chief.

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*Citations received up to 9th June 2021 for articles published in 2016-2020 in journals listed in Web of Science®. Data obtained on 9th June 2021, from Digital Science's Dimensions platform, available at https://app.dimensions.ai.

**Usage in 2018-2020 for articles published in 2016-2020.

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### Preparing Your Paper

All authors submitting to medicine, biomedicine, health sciences, allied and public health journals should conform to the Uniform Requirements for Manuscripts Submitted to Biomedical Journals, prepared by the International Committee of Medical Journal Editors (ICMJE).

### Structure

Your paper should be compiled in the following order: title page; abstract; keywords; main text introduction, materials and methods, results, discussion; acknowledgments; declaration of interest statement; references; appendices (as appropriate); table(s) with caption(s) (on individual pages); figures; figure captions (as a list).

### Word Limits

Please include a word count for your paper.

A typical paper (review articles or research reports) for this journal should be no more than 7,500 words, inclusive of abstract, within text citations but excluding words in the reference list.

For research notes, the abstract should be no longer than 250 words. The maximum length of the main report should not be more than 2,500 words (including within text references). You can include up to three figures or tables. No appendices are allowed. Maximum number of references in the reference list, no more than 20.

If you wish to include supplementary materials in the research note, these should not exceed three pages.

### Style Guidelines

Please refer to these quick style guidelines when preparing your paper, rather than any published articles or a sample copy.

Please use British (-ise) spelling style consistently throughout your manuscript.

Please use double quotation marks, except where “a quotation is ‘within’ a quotation”.

Please note that long quotations should be indented without quotation marks.

Any direct quotation, regardless of length, must be accompanied by a reference citation that includes a page number. Any quotation over six manuscript lines should have formal written permission to quote from the copyright owner. It is the author’s responsibility to determine whether permission is required from the copyright owner and, if so, to obtain it. (See Using third party material in your article for more information about seeking copyright permission.)

Submissions involving research with people with aphasia as participants should include as comprehensive as possible participant descriptions and assessment details. The DESCRIBE checklist of the Collaboration of Aphasia Trialists should be followed as much as possible. https://www.aphasiatrials.org/describe/. Additionally, aphasia type, setting(s) of data collection, handedness, co-morbid conditions (if relevant) should be included as appropriate. Referees can bear in mind this information when reviewing a submission.
Standard systematic reviews (with meta-analysis) should follow PRISMA 2020 principles. For systematic review without meta-analysis the SWiM guidelines (Campbell et al., 2020) should be followed https://www.bmj.com/content/368/bmj.l6890.

For other types of submissions, authors should seek guidance from the EQUATOR network https://www.equator-network.org/.
Greater detail will be required for single case studies than for large group studies. For single case studies detailed and clear assessment details including raw scores on assessments are usually required. Robey et al. (1999) recommend that for single case treatment studies, sufficient detail (e.g., raw scores, descriptive statistics) is required so that standard

deviations can be calculated from data presented to allow meta-analysis of series of published single case treatment studies.
Authors and referees please note that Aphasiology requires person first language. This means that the word ‘aphasic’ or ‘aphasics’ (plural) as nouns or adjectives are not permitted. Instead, person or individual with aphasia (or similar) should be used. The word ‘aphasic’ may be used only if it is qualified by ‘participants, speaker, subject, client, patient, person’, whichever is appropriate for the field of study (e.g., ‘patient’ in the context of a medical study, ‘speaker’ for linguistic and phonetic studies).

Abbreviations that are specific to a particular manuscript or to a very specific area of research should be avoided, and authors will be asked to spell out in full any such abbreviations when introduced in the text for the first time. Standard abbreviations such as RT for reaction time, SOA for stimulus onset asynchrony or other standard abbreviations that will be readily understood by readers of the journal are acceptable. Experimental conditions should be named in full, except in tables and figures.

### Formatting and Templates

Papers may be submitted in Word or LaTeX formats. Please do not submit your paper as a PDF. Figures should be saved separately from the text. To assist you in preparing your paper, we provide formatting template(s).

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A LaTeX template is available for this journal. Please save the LaTeX template to your hard drive and open it, ready for use, by clicking on the icon in Windows Explorer.

If you are not able to use the template via the links (or if you have any other template queries) please contact us here.

### References

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Read more on authorship.

Should contain a structured abstract between 150 and 400 words (maximum limit) A structured abstract should cover (in the following order):

Background: Describe the background to the study.

Aims: State the aims of the study including any research questions or hypotheses.

Methods & Procedures: To include outline of the methodology and design of the study using accepted terms; materials employed and participant numbers with comprehensive relevant demographic information; the nature of the analyses performed.

Outcomes & Results: Outline the important and relevant results of the analyses.

Conclusions: State the basic conclusions and implications of the study. State, clearly and usefully if there are implications for management, treatment or service delivery.

Read tips on writing your abstract.

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Find out how these can help your work reach a wider audience, and what to think about when filming.

Between 3 and 5 keywords. Read making your article more discoverable, including information on choosing a title and search engine optimization.

Funding details.

Please supply all details required by your funding and grant-awarding bodies as follows:

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Disclosure statement.

This is to acknowledge any financial or non-financial interest that has arisen from the direct applications of your research. If there are no relevant competing interests to declare please state this within the article, for example: The authors report there are no competing interests to declare.

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Data availability statement.

If there is a data set associated with the paper, please provide information about where the data supporting the results or analyses presented in the paper can be found. Where applicable, this should include the hyperlink, DOI or other persistent identifier associated with the data set(s).Templates are also available to support authors.

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## Queries

If you have any queries, please visit our Author Services website

or contact us here.

Appendix F – Table of Attrition Points (to be included in Supplementary Material for publication)

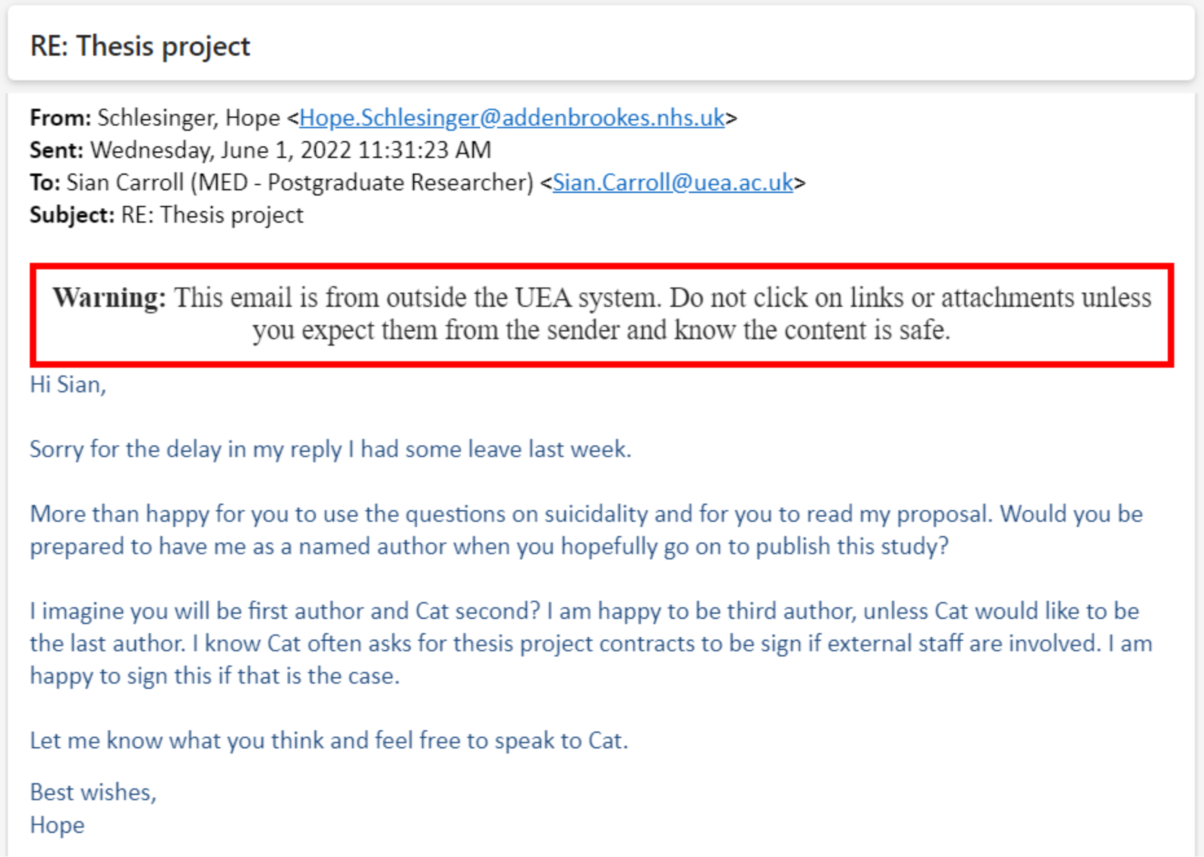
**Table 2**

*Summary of Attrition Points within Questionnaire*

| | *N* | (%) |
|---|---|---|
| Closed immediately after opening | 3 | (5) |
| Within the demographic questions | 15 | (25) |
| After the demographic questions | 16 | (26) |
| Start of questions about training | 1 | (2) |
| Start of questions about screening | 4 | (6) |
| Start of TPB questions | 4 | (6) |
| Start of the vignette | 18 | (30) |

*Note*. This table is ordered in the order of the questionnaire, not frequency, for ease of understanding how early into the questionnaire participants dropped out.

Appendix G – Consent gained from Dr Hope Schlesinger



RE: Thesis project

**From:** Schlesinger, Hope <Hope.Schlesinger@addenbrookes.nhs.uk>
**Sent:** Wednesday, June 1, 2022 11:31:23 AM
**To:** Sian Carroll (MED - Postgraduate Researcher) <Sian.Carroll@uea.ac.uk>
**Subject:** RE: Thesis project

**Warning:** This email is from outside the UEA system. Do not click on links or attachments unless you expect them from the sender and know the content is safe.

Hi Sian,

Sorry for the delay in my reply I had some leave last week.

More than happy for you to use the questions on suicidality and for you to read my proposal. Would you be prepared to have me as a named author when you hopefully go on to publish this study?

I imagine you will be first author and Cat second? I am happy to be third author, unless Cat would like to be the last author. I know Cat often asks for thesis project contracts to be sign if external staff are involved. I am happy to sign this if that is the case.

Let me know what you think and feel free to speak to Cat.

Best wishes,
Hope

Appendix H – Online Theory of Planned Behaviour Experimental Survey (adapted from Schlesinger, 2021)

## **Screening for People with Post-Stroke Aphasia**

University of East Anglia

Thank you very much for agreeing to complete this online questionnaire on screening people with post-stroke aphasia.

The questionnaire has 3 parts and should take roughly 15 minutes to complete. The following definitions may be helpful.

- Stroke is defined by the World Health Organisation (2014) as being caused by the interruption of the blood supply to the brain, usually because a blood vessel bursts or is blocked by a clot. This cuts off the supply of oxygen and nutrients, causing damage to the brain tissue. The effects of a stroke depend on which part of the brain is injured and how severely it is affected.
- Aphasia is defined by the Stroke Association as a communication disability that can affect the ability to understand, speak, read, write and use numbers. "The term aphasia (less commonly referred to as dysphasia) is used to describe an acquired loss or impairment of the language system following brain damage (Benson 1996). Usually associated specifically with language problems arising after a stroke, it excludes other communication difficulties attributed to sensory loss, confusion, dementia or speech difficulties due to muscular weakness or dysfunction, such as dysarthria" (Brady et al. 2016, p. 9).
- Suicidality refers to a range of behaviour that poses the risk of killing oneself, usually including thoughts of suicide, the presence of a suicidal plan or having intent to end one's life (Posner et al., 2014).

- Screening is defined by the World Health Organisation (2012) as using a simple test across a particular population (e.g. stroke survivors) to allow early identification of a condition; in this case, we are focusing on screening for depression and suicidality in people with aphasia post-stroke aphasia.

**Part 1**

Demographic information

**1.** Do you work in the UK or Australia?

UK Australia

**2.** During your usual practice, do you work with people with aphasia?

Yes No* *if selected no, will be exited from survey.

**3.** During your usual practice, in which setting do you work?

Hospital Ward (General)

Hospital Stroke Unit / Ward

Hospital Neurorehabilitation Unit / Ward

Voluntary Sector

Early Supported Discharge

Community Stroke Service

Community Neuro-Rehabilitation Service

Nursing Home

Private Practice

Residential Home

Older Peoples Hospital Unit/ Ward

Other, please specify

**4.** Does your current place of work have any specific suicide prevention guidelines or policies?

Yes No I don't know

**5.** How long have you worked as a Speech and Language Therapist for?

I am still a student

I have been qualified and working less than 1 year

I have been qualified and working between 2 – 5 years

I have been qualified and working between 6 – 10 years

I have been qualified and working more than 10 years

**6.** How long have you worked with people with post-stroke aphasia for?

Less than 1 year

Between 2 – 5 years

Between 6 – 10 years

More than 10 years

In this part of the survey, we would be grateful if you would estimate some percentages, by typing a value between 0 -100, where 0 = none and 100 = all.)

**7.** In your usual clinical setting / service, please estimate what percentage of people with post- stroke aphasia are screened for depression? This could be using either a formal or informal assessment.

**8.** In your usual clinical setting / service, please estimate what percentage of people with post- stroke aphasia are screened for suicidality? This could be using either a formal or informal assessment

**9.** In your usual clinical setting / service, who usually screens depression and suicidality in patients with post-stroke aphasia, or whose role would it be? (You can tick multiple options)

Clinical Psychologist

Stroke Physician

Speech and Language Therapist Assistant

Occupational Therapist Assistant

Physiotherapist

Clinical Neuropsychologist

Stroke Nurse

Assistant Practitioner

Other, please specify

Assistant Psychologist

Rehabilitation Consultant

Speech and Language Therapy

Occupational Therapy

Physiotherapy Assistant

Rehabilitation Assistant

Nursing Assistant

Social Worker

Don’t Know

In this part of the survey, we would be grateful if you would estimate using a percentage, how likely you think you are to complete a specific action by typing a value between 0 -100, where 0 = “I am not likely to”, and 100 = “I am very likely to”.

**10.** During usual clinical practice, how likely would it be for <u>you</u> to screen a person with post-stroke aphasia, for suicidal thoughts, intent or a plan? This could be a formal or informal assessment

<u>Experience of Training and Guidelines</u>

**11.** Have you had any training on suicide?

Yes No

**12.** Have you had any training on how to screen for suicidality?

Yes No

**13.** Have you had any training on aphasia (e.g. what it is and how it presents)?

Yes No

**14.** Have you had any supported communication training for working with people with aphasia?

Yes No

**15.** Are you aware of or have you read any official guidelines for depression e.g. NICE Guidelines?

Yes No

**16.** Are you aware of or have your read any official guidelines for aphasia e.g. Aphasia Rehabilitation Best Practice Statements 2014?

Yes No

**17.** Are you aware of the statistics surrounding aphasia and suicidality links / risks?

Yes No

Ways of Screening

**18.** During usual clinical practice, what methods do you use to screen for suicidality with patients with post- stroke aphasia? (You can tick multiple options)

Clinical interview with patient

Clinical interview with a family member, carer or staff

Standardised self-report measure (e.g. PHQ) with patient

Standardised self-report measure (e.g. SADQ) with family member or carer

Observer rating scale (e.g. Hamilton Rating Scale for Depression)

No screening used currently

Other please specify

**19.** During usual clinical practice, Do you use any standardised self-report measures with patients with post- stroke aphasia, if so what? (You can tick multiple options)

Visual Analogue Mood Scales

The Depression Intensity Scale Circles (DISCS)

Patient Health Questionnaire (PHQ)

Hospital Anxiety and Depression Scale (HADS)

Distress Thermometer

Cornell Depression Scale

Structured Assessment of Depression in Brain Damage

Aphasia Impact Questionnaire

No screening used currently

I do not know

Other please specify

**20.** During usual clinical practice, do you use an observer rating scale and if so what? (You can tick multiple options)

Hamilton Rating Scale for Depression

Montgomery Åsberg Depression Rating Scale

Signs of Depression Scale

Stroke Aphasic Depression Questionnaire (SADQ-21)

Stroke Aphasic Depression Questionnaire- H10

Aphasia Depression Rating Scale (ADRS)

No screening used currently

I do not know

Other please specify

In this part of the survey, we will give you some statements about screening for suicidality in people with post-stroke aphasia. We will give opposing opinions on each statement. Please move the bar to the position on the line to represent where you feel your opinion lies.

**21.** In terms of managing risk, screening for depression is:

Useful _____________________________________________Not Useful

**22.** Discussing suicidal thoughts and intent with people with post-stroke aphasia:

Decreases risk of suicide______________________ Increases risk of suicide

**23.** Screening for suicidality helps identify people with post-stroke aphasia who would benefit from psychological therapy:

Definitely True____________________________________Definitely False

**24.** In terms of treatment planning, screening for suicidality is:

Not beneficial________________________________________Beneficial

**25.** Time pressures at work, affect how regularly I screen for suicidality in people with post-stroke aphasia:

Definitely True___________________________________Definitely False

**26.** I would describe my methods of facilitating people with aphasia to communicate as:

Limited_____________________________________________________Effective

**27.** When discussing suicidality with people with post-stroke aphasia I feel:

Uncomfortable______________________________________Comfortable

**28.** In terms of my skills in screening for suicidality with people with post-stroke aphasia, I feel:

Confident__________________________________________Unconfident

**29.** How routinely do others in my profession routinely screen for suicidality with people with post-stroke aphasia:

Never_________________________________________________Always

**30.** I would screen for suicidality in people with post-stroke aphasia:

Never ________________________________________________ Always

**31.** I would describe the level of training I have received on aphasia as:

Comprehensive__________________________________________Absent

**32.** Assessing for suicidality in people who have depression is:

Part of my job role___________________________ Not part of my job role

**33.** Screening for suicidality with people with post-stroke aphasia is:

Not part of my job role___________________________ Part of my job role

**34.** In terms of my skills managing suicidal risk in people with post-stroke aphasia, I feel:

Confident__________________________________________Unconfident

**35.** I would describe the level of training I have received on screening for suicidality as:

Absent__________________________________________Comprehensive

**36.** In terms of optimising rehabilitation, screening for depression is:

Helpful______________________________________________Unhelpful

**37.** My colleagues expect me to screen for suicidality with people with post-stroke aphasia:

Definitely False____________________________________Definitely True

**38.** Treating suicidality effectively with psychological therapy in people with post-stroke aphasia is:

Possible__________________________________________ Not possible

**39.** If a person with post-stroke aphasia is experiencing depression or suicidal ideation, there is a local service to support them:

Definitely False____________________________________Definitely True

**40.** I would describe recognising suicidality in people with post-stroke aphasia as:

Straightforward______________________________________Challenging

**41.** Suicidality influences patients' engagement in rehabilitation:

Minimally__________________________________________Significantly

**42.** I would describe my methods of facilitating people with post-stroke aphasia to understand me as:

Effective ______________________________________________Limited

**43.** Using a standardised screening tools for depression with a person with post-stroke aphasia is:

Inaccurate ______________________________________________ Accurate

**44.** Following evidence-based practice is:

Important______________________________________________Unimportant

**45.** In terms of managing risk, discussing suicidality is:

Not Useful ______________________________________________Useful

**46.** In terms of managing risk, screening for suicidality is:

Not Useful______________________________________________Useful

**47.** I would describe the level of training I have received on screening for suicidality in those with post-stroke aphasia as:

Comprehensive______________________________________________Absent

## Part 2

In this part of the survey, we would like you to read the following vignette. Please take your time to read the information carefully.

## Part 3

Next we would like you to answer the following questions. Some are questions that allow you to write your own responses, and in others we will give you some statements with opposing opinions on each statement.

Please move the bar to the position on the line to represent where you feel your opinion lies.

Some of these questions are the same you have previously answered. Please answer them with the vignette in mind.

**48.** Based on the information in the vignette, what would you do in this situation?

**49.** How likely would you be to screen this person for suicidality:

Not at all ____________________________________________ Definitely

**50.** What factors in the vignette influenced your decision on screening this person?

**51.** I would screen for suicidality in people with post-stroke aphasia:

Never __________________________________________________ Always

**52.** Assessing for suicidality in people who have depression is:

Part of my job role____________________________ Not part of my job role

**53.** When discussing suicidality with people with post-stroke aphasia I feel:

Uncomfortable______________________________________Comfortable

**54.** In terms of my skills in screening for suicidality with people with post-stroke aphasia, I feel:

Confident__________________________________________Unconfident

**55.** In terms of treatment planning, screening for suicidality is:

Not beneficial ________________________________________Beneficial

**56.** Time pressures at work, affect how regularly I screen for suicidality in people with post-stroke aphasia:

Definitely True____________________________________Definitely False

**57.** I would describe the level of training I have received on screening for suicidality as:

Absent__________________________________________Comprehensive

**58.** My colleagues expect me to screen for suicidality with people with post-stroke aphasia:

Definitely False____________________________________Definitely True

**59.** In terms of my skills managing suicidal risk in people with post-stroke aphasia, I feel:

Confident__________________________________________Unconfident

**60.** In terms of managing risk, screening for depression is:

Useful______________________________________________Not Useful

**61.** Suicidality influences patients' engagement in rehabilitation:

Minimally__________________________________________Significantly

**62.** Are there any factors which influenced your decision to screen for suicidality in the vignette?

**63.** Are there any factors which influenced your decision to screen for suicidality with people with post stroke aphasia in general?

**64.** What would be required for you to feel more likely to screen for suicidality in this population?

Appendix I – Vignettes

## Test Condition

You have recently joined a new team as a Speech and Language Therapist. This new team works with people with post-stroke aphasia and you conduct routine appointments with this population. Prior to starting in your new role, you met the team and some service user representatives at interview. During the interview, it was shared with you that the team lead had a colleague who lost a client with aphasia to suicide recently, and the team feel it is important to spot any possible signs that clients are at risk of suicide. Additionally, the team and SU reps gave you plenty of information on how the team works, what your job role will entail etc, and what is important to both the team and the people they care for. This included how they support people after a stroke and that they expect all team members to work according to:

- Values of care, compassion, and empathy
- Up to date training and reading of relevant papers and guidance
- Screening for, identifying and supporting people with emotional needs (e.g., low mood, suicidality); cognitive needs (e.g., changes to cognitive functioning); and physical needs (e.g., mobility, pain, fatigue).

Your new team requires you to record clinical notes on the same working day, including records of all risk assessments in these notes. You go into a routine session with a patient with post-stroke aphasia one day and notice that throughout the session your patient appears withdrawn, visibly low, and distressed. He does not engage as well in your rehabilitation throughout the session and communication is more difficult than usual today.

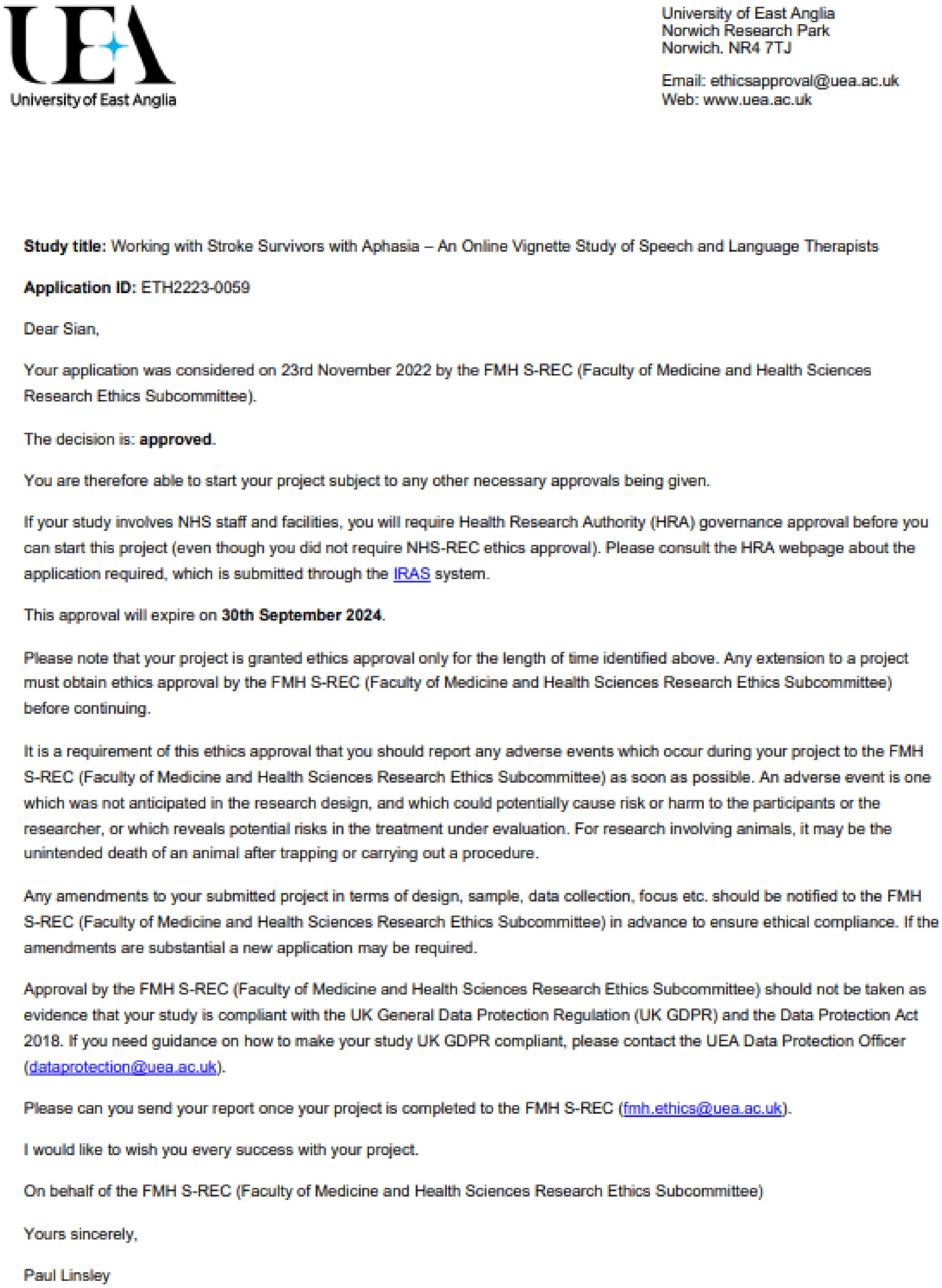
## Control Condition

You have recently joined a new team a Speech and Language Therapist. This new team works with people with post-stroke aphasia and you conduct routine appointments with this population. Prior to starting in your new role, you met the team and some service user representatives at interview. During the interview, it was shared with you that the team lead had a colleague who lost a client with aphasia to difficulties with aspiration pneumonia recently, and the team feel it is important to spot any possible signs that clients are at risk of aspiration pneumonia. Additionally, the team and SU reps gave you plenty of information on how the team works, what your job role will entail etc, but also on what is important to both the team and the people they care for. This included how they support people after a stroke and is something they expect all team members to work according to:

- Values of care, compassion, empathy
- Up to date training and reading of relevant papers and guidance
- Screening for, identifying and supporting people with cognitive needs (e.g.,attention and memory); swallowing needs (e.g., eating and drinking), communication needs (e.g., comprehension and expression), and social participation needs.

You go into a routine session with a patient with post-stroke aphasia one day and notice that throughout the session your patient appears withdrawn, visibly low, and distressed. He does not engage as well in your rehabilitation throughout the session and communication is more difficult than usual today.

## Appendix J – Ethical Approval



University of East Anglia
Norwich Research Park
Norwich. NR4 7TJ

Email: ethicsapproval@uea.ac.uk
Web: www.uea.ac.uk

**Study title:** Working with Stroke Survivors with Aphasia – An Online Vignette Study of Speech and Language Therapists

**Application ID:** ETH2223-0059

Dear Sian,

Your application was considered on 23rd November 2022 by the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee).

The decision is: **approved**.

You are therefore able to start your project subject to any other necessary approvals being given.

If your study involves NHS staff and facilities, you will require Health Research Authority (HRA) governance approval before you can start this project (even though you did not require NHS-REC ethics approval). Please consult the HRA webpage about the application required, which is submitted through the IRAS system.

This approval will expire on **30th September 2024**.

Please note that your project is granted ethics approval only for the length of time identified above. Any extension to a project must obtain ethics approval by the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) before continuing.

It is a requirement of this ethics approval that you should report any adverse events which occur during your project to the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) as soon as possible. An adverse event is one which was not anticipated in the research design, and which could potentially cause risk or harm to the participants or the researcher, or which reveals potential risks in the treatment under evaluation. For research involving animals, it may be the unintended death of an animal after trapping or carrying out a procedure.

Any amendments to your submitted project in terms of design, sample, data collection, focus etc. should be notified to the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) in advance to ensure ethical compliance. If the amendments are substantial a new application may be required.

Approval by the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) should not be taken as evidence that your study is compliant with the UK General Data Protection Regulation (UK GDPR) and the Data Protection Act 2018. If you need guidance on how to make your study UK GDPR compliant, please contact the UEA Data Protection Officer (dataprotection@uea.ac.uk).

Please can you send your report once your project is completed to the FMH S-REC (fmh.ethics@uea.ac.uk).

I would like to wish you every success with your project.

On behalf of the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee)

Yours sincerely,

Paul Linsley

Appendix K – Participant Information Sheet

**Faculty of Medicine & Health Sciences**
Norwich Medical School
University of East Anglia
Norwich Research Park
Norwich, NR4 7TJ
United Kingdom

## Electronic Participant Information Sheet

Thank you for taking the time to consider taking part in this study. Before you decide to complete the study, it is important for you to understand why the research is being conducted and what participation will involve. Please take some time to read the following information carefully and raise any questions you may have with our researchers (Siân Carroll: sian.carroll@uea.ac.uk or Dr. Catherine Ford: catherine.ford@uea.ac.uk).

### (1) What is this study about?

Stroke survivors with communication difficulties post stroke (aphasia) are at a greater risk of low mood, depression and suicide than those without aphasia. Despite this, there is no current published research exploring screening rates or practice in this client group. We hope to explore with staff what may influence current screening practices in aphasia and what factors are helpful and unhelpful in screening. This study aims to give staff a voice to highlight barriers to this, which can then be used to support staff to continue to improve patient care and effectively support those with aphasia.

### (2) Why have I been invited?

You have been invited to take part as a Speech and Language Therapist working in stroke care and with people with post-stroke aphasia. Taking part, however, is entirely voluntary and you can choose to refuse or withdraw now and in the future with no consequences.

### (3) What will the study involve for me?

If you do choose to participate, you will be asked to complete a questionnaire with 3 parts. This will involve you answering an online questionnaire, reading a case vignette, and answering some further questions. The study will take roughly 15-20 minutes to complete and we have aimed to make this as concise and short as possible for your convenience.

You can withdraw from the questionnaire at any time, by simply exiting the questionnaire and your data will not be recorded or included in the study.

### (4) Are there any risks and/or disadvantages with participating in this study?

We acknowledge that mental health can be an emotive and difficult topic for people. However, within the study you will not be asked or expected to discuss any specific cases or personal experiences of this, and we aim to keep the case vignette as broad as possible to minimise any potential distress to you. However, we do understand that this may bring your own experiences to mind and cause you some discomfort; therefore, we would like to reiterate that you are under no obligation to take part. Information regarding further support services and resources on suicide will be made available at the end of the questionnaire should you feel that you require any additional support or CPD around this.

If you do wish to contact the researchers regarding this, please contact me by email (sian.carroll@uea.ac.uk) to discuss any issues of concern.

### (5) Are there any benefits associated with being in the study?

This study hopes to give you a chance to voice your own opinions and experiences in relation to screening practices in stroke services and what may or may not support the increase of these. It gives you the opportunity of being part of research in factors that affect screening practices and hopefully increase the support offered to those with post-stroke aphasia. After completing the study, you will be provided with information and documents that you may wish to read or take back to your teams, that may support or inform your work going forward.

### (6) What will happen to information about me that is collected during the study?

Only non-identifiable information will be recorded, so you will be completely anonymous throughout. The information collected will be kept strictly confidential. Data will be stored securely according to the General Data Protection Regulation Act (2018) and the University of East Anglia Research Data Management Policy (2019). Data will be stored on a UEA OneDrive with double password protection and removed when the analyses and publication of the study are completed. Following this, data will be stored on the UEA data repository, complying with the Act and Policy named above.

### (7) Will I be told the results of the study?

It is hoped that the study will be published in 2024 and that we will circulate this to professional bodies that took part in the research.

### (8) What if I would like further information, or have a complaint or concerns about the study?

Should you need more information about the research study, please do not hesitate to contact me at sian.carroll@uea.ac.uk and raise any questions you may have.

If you are concerned about the way this study is being conducted or you wish to make a complaint to someone independent from the study, please contact the University administration team by email (med.reception@uea.ac.uk) and they will direct your concerns to a senior faculty member.

### (9) Who is running the study?

This research is being conducted by Siân Carroll, Postgraduate Researcher in the Doctorate in Clinical Psychology Programme (ClinPsyD) at Norwich Medical School, UEA. This is being done under the supervision of Dr Catherine Ford and

Professional Niall Broomfield. The research is funded by the University of East Anglia and has been reviewed by the University Research Ethics Committee.

Please contact Siân Carroll (sian.carroll@uea.ac.uk) for further information, and if you are unhappy about any aspect of the study, please contact Dr Catherine Ford (catherine.ford@uea.ac.uk) regarding this.

Appendix L – Consent Form

**Faculty of Medicine & Health Sciences**
Norwich Medical School
University of East Anglia
Norwich Research Park
Norwich, NR4 7TJ
United Kingdom

## Electronic Consent Form

Please indicate you consent by selecting the box below:

1. I confirm that I am a Speech and Language Therapist (or student).

2. I confirm that I have read and understand the Participant Information Sheet and have had the opportunity to ask any questions that I have about the study via the email addresses outlined in the Participant Information Sheet and am happy with the answers.

3. I understand the purpose, procedure and any benefits or risks involved with the study.

4. I understand that no personal information or identifiable data will be collected during this research.

5. I agree that my data gathered in this study will be stored anonymously and securely and may be used for future research.

6. I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason.

7. I understand that this research can be audited by the University of East Anglia or the regulatory authorities. I therefore give permission for these organisations to access my anonymous data.

8. I agree to take part in this study

Appendix M – Debrief Sheet

**Faculty of Medicine & Health Sciences**
Norwich Medical School
University of East Anglia
Norwich Research Park
Norwich, NR4 7TJ
United Kingdom

## Electronic Debrief Page

Dear participant,

Thank you for taking part in this study; your time and participation are greatly appreciated.

### What was the aim?

The aim of this study was to better understand what factors may influence a person's intention to screen for suicidality in people with aphasia, as well as exploring possible barriers and facilitators to screening. This was to better understand how we can support Speech and Language Therapists, and potentially wider professional groups, to feel more confident, comfortable and able to screen for suicidality in this population. This will help to inform clinical practice by helping services and individuals to continue to improve screening rates and the risk management and care of those with aphasia.

### Why is it important?

Previous research shows that people with aphasia are at greater risk of suicide than those without aphasia, but that people with aphasia are not routinely screened for this. Several national and clinical guidelines recommend screening for both depression and suicide after a stroke, especially in those with aphasia, but recent publications and research show that this is not yet routine within services. Without this screening, there is a risk that people may not receive appropriate treatment, and sadly may die by suicide.

Researchers have begun to identify barriers to screening for depression in the stroke population. The barriers highlighted include: lack of training; low confidence; negative attitudes towards the utility of screening; negative beliefs about following evidence-based practice; negative beliefs about the validity of screening tools and not feeling screening was part of their job role. Furthermore, researchers have applied a psychological model of behavioural intention, The Theory of Planned Behaviour (Ajzen, 1985), to try and predict an individual’s intention to engage in screening for depression.

However, despite the increased risk of suicide in people with aphasia, a recent doctoral thesis shown that while professionals are very likely to screen for low mood (Mode: 100%), they are much less likely to screen for suicidality / suicide risk (Mode: 0%). Therefore, we wanted to try to understand more about how we can support the increase of this screening.

### Why Speech and Language Therapists?

The 2016 SSNAP audit (Intercollegiate Stroke Working Party, 2016) identified that only 6% of acute stroke sites have a psychologist, therefore suggesting that screening for both low mood and suicide will likely fall to other professionals within acute stroke services. Additionally, SLT’s are the most likely professional to work with aphasia due to speech and language therapy being the main treatment for communication difficulties (Stroke Association, 2021c).

### What if I want to know more?

We understand that this topic may have been sensitive or difficult for you, and greatly appreciate your participation in the research. If you have felt emotionally impacted by the topics discussed within the research or if you are interested in learning more, please explore the resources below. We have provided further sources of support and CPD that you may find useful and helpful.

If you would like to be informed directly when this study is published, or would like to receive a summary of the findings, please add your email address below.

Thank you again.

Below we have included further information and sources of support, should you need / want it. We would also recommend talking to your line manager / supervisor / professional body if anything has arisen that you would benefit from further conversations about. Additionally, please feel free to contact Siân Carroll (primary researcher: sian.carroll@uea.ac.uk), Dr Catherine Ford (primary supervisor: catherine.ford@uea.ac.uk), or Professor Richard Meiser-Stedman (postgraduate research director: r.meiser-stedman@uea.ac.uk) should you wish.

**Suicide Prevention Guidance & Emotional Support - UK**

NICE Suicide Prevention Quality Standard- Draft for Consultation

Information on ways to reduce suicide and help people bereaved or affected by suicides.

https://www.nice.org.uk/guidance/qs189/documents/194

The National Suicide Prevention Alliance (NSPA)

An alliance of public, private, voluntary and community organisations in England working to reduce and prevent suicide and support those affected by suicide.

Website: https://www.nspa.org.uk/

Samaritans

Samaritans are available 24 hours a day for anyone struggling to cope and provide a safe place to talk where calls are completely confidential.

Phone: 116 123

Website: https://www.samaritans.org/

**Suicide Prevention Guidance & Emotional Support – Australia**

National Mental Health and Suicide Prevention Plan

Sets out the Australian Government's commitment to supporting mental health and suicide prevention for all Australians

https://www.health.gov.au/resources/publications/the-australian-governments-national-mental-health-and-suicide-prevention-plan

National Suicide Prevention Strategy (NSPS)

A nationally coordinated approach to suicide prevention, with four interrelated components.

https://www1.health.gov.au/internet/publications/publishing.nsf/Content/suicide-prevention-activities-evaluation~background~national-suicide-prevention-strategy

Lifeline

A national charity providing all Australians a 24 hour crisis support and suicide prevention service.

Phone: 13 11 14

Website: https://www.lifeline.org.au/

**Stroke Guidance & Support – UK**

NICE Stroke Guidance

Information and guidance on stroke rehabilitation, including assessment of emotional functioning, support for emotional adjustment and management of depression and anxiety following a stroke.

https://www.nice.org.uk/guidance/cg162

National Clinical Guidelines for Stroke

Royal College of Physicians – Prepared by the Intercollegiate Stroke Working Party

Provides a comprehensive examination of stroke care, encompassing the whole of the stroke pathway from acute care through to longer-term rehabilitation, including secondary prevention. The edition also informs healthcare professionals about what should be delivered to stroke patients and how this should be organised, with the aim of improving the quality of care for everyone who has a stroke.

https://www.strokeaudit.org/SupportFiles/Documents/Guidelines/2016-National-Clinical-Guideline-for-Stroke-5t-(1).aspx

Stroke Clinical Practice Guidelines

Duncan et al. (2005). Management of Adult Stroke Rehabilitation Care: a clinical practice guideline. Stroke, 36(9):e100-43. https://doi.org/10.1161/01.STR.0000180861.54180.FF

Miller, E. L., Murray, L., Richards, L., Zorowitz, R. D., Bakas, T., Clark, P., & Billinger, S. A. (2010). Comprehensive overview of nursing and interdisciplinary rehabilitation care of the stroke patient: a scientific statement from the American Heart Association. Stroke, 41(10), 2402-2448. https://doi.org/10.1161/STR.0b013e3181e7512b

Stroke Association

A UK charity that provides specialist support, fund critical research and campaign to make sure people affected by stroke get the very best care and support to rebuild their lives.

Website: https://www.stroke.org.uk

## Stroke Guidance & Support – Australia

### Clinical Guidelines for Stroke Management

Information and guidance on stroke care across 8 chapters, including early assessment and diagnosis and rehabilitation.

https://informme.org.au/Guidelines/Clinical-Guidelines-for-Stroke-Management

### Stroke Clinical Practice Guidelines

Duncan et al. (2005). Management of Adult Stroke Rehabilitation Care: a clinical practice guideline. Stroke, 36(9):e100-43. https://doi.org/10.1161/01.STR.0000180861.54180.FF

Miller, E. L., Murray, L., Richards, L., Zorowitz, R. D., Bakas, T., Clark, P., & Billinger, S. A. (2010). Comprehensive overview of nursing and interdisciplinary rehabilitation care of the stroke patient: a scientific statement from the American Heart Association. Stroke, 41(10), 2402-2448. https://doi.org/10.1161/STR.0b013e3181e7512b

### Stroke Foundation

An Australian charity that stands alongside stroke survivors, their families, healthcare professionals and researchers to build community awareness and foster innovative treatments, as well as supporting survivors on their journey.

Website: https://strokefoundation.org.au/

### Aphasia Guidance & Support

National Aphasia Association

Information, resources and guidance on aphasia for professionals.

https://www.aphasia.org/category/i-am-a-professional/

Stroke Association Guidance – UK

https://www.stroke.org.uk/sites/default/files/accessible_information_guidelines.pdf1_.pdf

https://www.stroke.org.uk/what-is-aphasia/mood-and-emotional-changes

Stroke Foundation Guidance – Australia

https://enableme.org.au/resources/speech-and-language

https://enableme.org.au/factsheets/how-do-i-ask-a-question

Aphasia.com

A team, Lingraphica, who help people with speech and language impairments improve communication, speech and quality of life. Includes resources, guidance and information.

https://www.aphasia.com/aphasia/communication-tips/

https://www.aphasia.com/aphasia-resource-library/

Further Potentially Helpful Reading

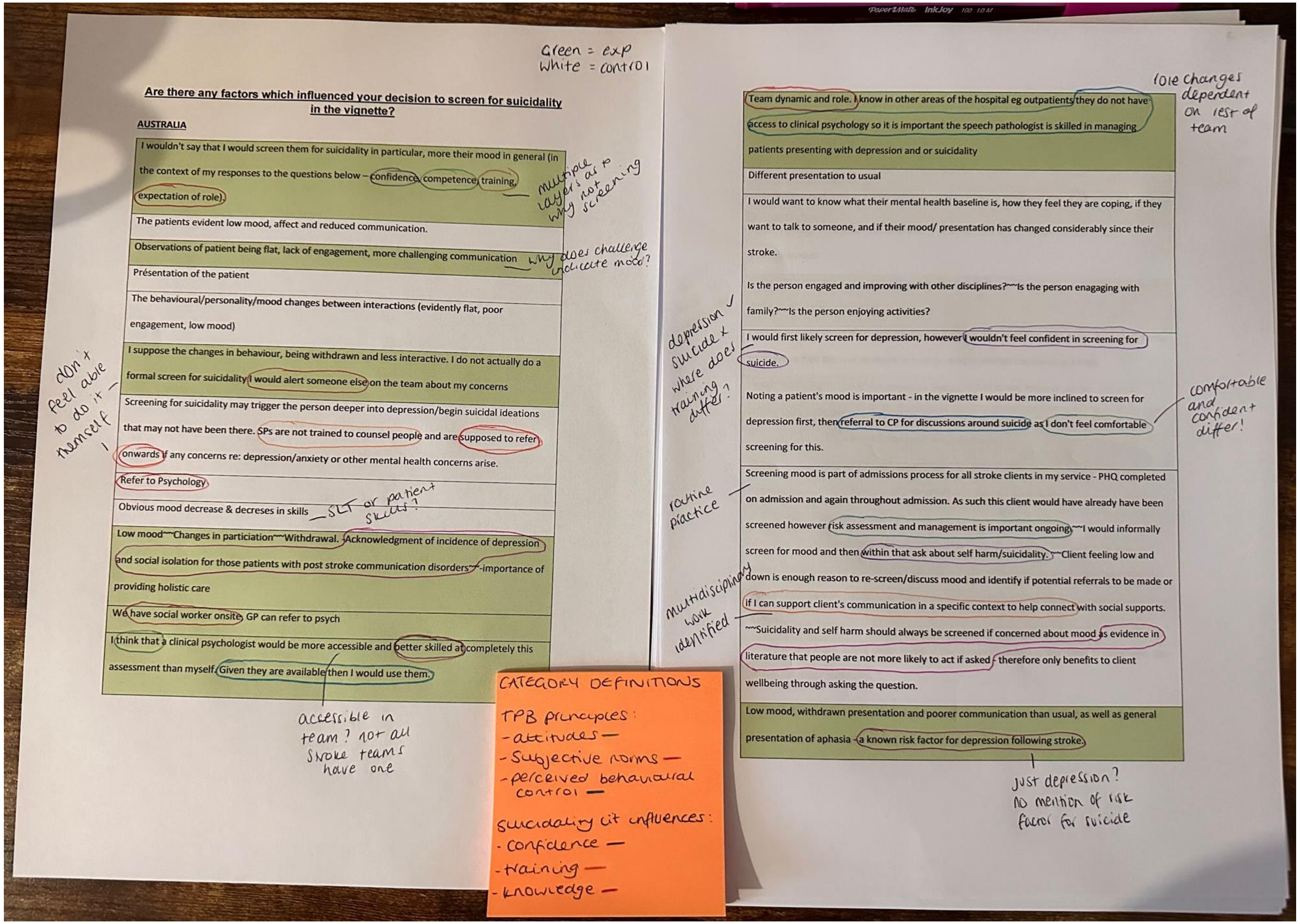
Sandberg, C. W., Nadermann, K., Parker, L., Kubat, A. M., & Conyers, L. M. (2021). Counseling in aphasia: Information and strategies for speech-language pathologists. *American journal of speech-language pathology*, *30*(6), 2337-2349. https://doi.org/10.1044/2021_ajslp-20-00312

Ryan, B. J., Clunne, S. M., Baker, C. J., Shiggins, C., Rose, M. L., & Kneebone, I. I. (2021). A systematic review of non-drug interventions to prevent and treat anxiety in people with aphasia after stroke. *Disability and rehabilitation*, 1-10. https://doi.org/10.1080/09638288.2021.1925752

Kneebone, I., Baker, J., & O'Malley, H. (2010). Screening for depression after stroke: developing protocols for the occupational therapist. *British Journal of Occupational Therapy*, *73*(2), 71-76. http://dx.doi.org/10.4276/030802210X12658062793843

Thomas, S. A., Walker, M. F., Macniven, J. A., Haworth, H., & Lincoln, N. B. (2013). Communication and Low Mood (CALM): a randomized controlled trial of behavioural therapy for stroke patients with aphasia. *Clinical rehabilitation*, *27*(5), 398-408. https://doi.org/10.1177/0269215512462227

## Appendix N – Example of Content Analysis Coding



Green = exp
White = control

**Are there any factors which influenced your decision to screen for suicidality in the vignette?**

**AUSTRALIA**

| |
|---|
| I wouldn't say that I would screen them for suicidality in particular, more their mood in general (in the context of my responses to the questions below – confidence, competence, training, expectation of role). |
| The patients evident low mood, affect and reduced communication. |
| Observations of patient being flat, lack of engagement, more challenging communication |
| Présentation of the patient |
| The behavioural/personality/mood changes between interactions (evidently flat, poor engagement, low mood) |
| I suppose the changes in behaviour, being withdrawn and less interactive. I do not actually do a formal screen for suicidality I would alert someone else on the team about my concerns |
| Screening for suicidality may trigger the person deeper into depression/begin suicidal ideations that may not have been there. SPs are not trained to counsel people and are supposed to refer onwards if any concerns re: depression/anxiety or other mental health concerns arise. |
| Refer to Psychology |
| Obvious mood decrease & decreses in skills |
| Low mood~~Changes in particiation~~Withdrawal. -Acknowledgment of incidence of depression and social isolation for those patients with post stroke communication disorders~~-importance of providing holistic care |
| We have social worker onsite, GP can refer to psych |
| I think that a clinical psychologist would be more accessible and better skilled at completely this assessment than myself. Given they are available then I would use them. |

multiple layers as to why not screening

why does challenge indicate mood?

don't feel able to do it themself

SLT or patient skills?

accessible in team? not all stroke teams have one

| |
|---|
| Team dynamic and role. I know in other areas of the hospital eg outpatients they do not have access to clinical psychology so it is important the speech pathologist is skilled in managing patients presenting with depression and or suicidality |
| Different presentation to usual |
| I would want to know what their mental health baseline is, how they feel they are coping, if they want to talk to someone, and if their mood/ presentation has changed considerably since their stroke.<br>Is the person engaged and improving with other disciplines?~~Is the person enagaging with family?~~Is the person enjoying activities? |
| I would first likely screen for depression, however I wouldn't feel confident in screening for suicide.<br>Noting a patient's mood is important - in the vignette I would be more inclined to screen for depression first, then referral to CP for discussions around suicide as I don't feel comfortable screening for this. |
| Screening mood is part of admissions process for all stroke clients in my service - PHQ completed on admission and again throughout admission. As such this client would have already have been screened however risk assessment and management is important ongoing.~~I would informally screen for mood and then within that ask about self harm/suicidality. ~~Client feeling low and down is enough reason to re-screen/discuss mood and identify if potential referrals to be made or if I can support client's communication in a specific context to help connect with social supports. ~~Suicidality and self harm should always be screened if concerned about mood as evidence in literature that people are not more likely to act if asked - therefore only benefits to client wellbeing through asking the question. |
| Low mood, withdrawn presentation and poorer communication than usual, as well as general presentation of aphasia - a known risk factor for depression following stroke. |

role changes dependent on rest of team

depression ✓ suicide ✗ where does training differ?

comfortable and confident differ!

routine practice

multidisciplinary work identified

just depression? no mention of risk factor for suicide

CATEGORY DEFINITIONS

TPB principles:
- attitudes —
- subjective norms —
- perceived behavioural control —

suicidality cit influences:
- confidence —
- training —
- knowledge —

## Appendix O – Recruitment Material for Social Media and Emails

Recruitment Email:

Good evening,

I hope it is okay to send this email. Please do let me know if you require any further information or if there is a more appropriate route to make this request.

I'm a current Doctorate in Clinical Psychology student at the University of East Anglia. I am conducting my thesis on post-stroke aphasia and SLT's, and I am reaching out to you to see if you could kindly share my survey link with your SLT colleagues within the CSLIR or your mailing list.

I have included some further information about the research, including the survey link, below.

Thank you very much in advance,

Best wishes

Sian Carroll

"The purpose of this ClinPsyD research is to look at staff screening behaviours with people with post-stroke aphasia, specifically Speech and Language Therapists.

We know that stroke survivors with communication difficulties post stroke are at an increased risk of low mood and depression than those without aphasia, but despite this there is no current published research exploring screening rates with this client group. We hope to explore with staff what may influence current screening practices in aphasia and what factors are helpful / unhelpful in screening; giving staff a voice to highlight barriers to this, which can then be used to support staff to continue to improve patient care and effectively support people with aphasia.

We are focusing on Speech and Language Therapists as they are the most qualified professional group to adapt communication and likely to come into contact with people quickly after their stroke, in line with National Clinical Guidelines for Stroke.

It is an online, complete anonymous questionnaire, and it would be great if you could complete the survey if you are able to in your own time and / or pass onto SLT colleagues you know. It takes roughly 15 minutes to do. Thank you very much in advance!

The link to the survey is: https://www.psytoolkit.org/c/3.4.2/survey?s=gEAYm "

Recruitment Social Media Post:

Facebook / LinkedIn Example:

Calling all UK and Australian #stroke #speechandlanguagetherapists #SLT! We invite you to complete this online questionnaire on screening people with #aphasia after a stroke (UK: https://www.psytoolkit.org/c/3.4.2/survey?s=gEAYm. AUS: https://www.psytoolkit.org/c/3.4.2/survey?s=3n2PF).

We know those with aphasia are at an increased risk of low mood and that it might be challenging to support such patients. It will only take 15 minutes and will help to provide an insight into how best to support SLT's working with aphasia.

Thank you in advance! 🧠😊

Twitter / X Examples:

UK & Australian #stroke #speechandlanguagetherapists #SLTs! We invite you to complete this online questionnaire on screening people with #aphasia after a stroke (UK: https://psytoolkit.org/c/3.4.2/survey?s=gEAYm…. AUS: https://psytoolkit.org/c/3.4.2/survey?s=3n2PF…). Thank you in advance!

June is #AphasiaAwarenessMonth. The impact of aphasia is so widespread, with anxiety & depression being common in people with aphasia. Are you a #SLT #SLP? Can you help us better understand how to support people w/ aphasia? UK: https://psytoolkit.org/c/3.4.2/survey?s=gEAYm… Aus: https://psytoolkit.org/c/3.4.2/survey?s=3n2PF

Recruitment Poster

University of East Anglia

FOR MORE INFO:
Please email
sian.carroll@uea.ac.uk
Trainee Clinical Psychologist

TALKING
WRITING
READING
NUMBERS
APHASIA

**SPEECH AND LANGUAGE THERAPISTS!**

**DO YOU WORK WITH PEOPLE WITH POST-STROKE APHASIA IN THE UK OR AUSTRALIA?**

Depression is common after stroke, especially for someone with aphasia.

Please complete our short, anonymous, online questionnaire on supporting people with post-stroke aphasia and your work supporting them.

The questionnaire has ethical approval from the University of East Anglia. It takes 15 minutes to complete and we hope it will inform continued improvement in support for people with post-stroke aphasia.

CLICK THE LINK OR QR CODE TO TAKE PART!

**UK**: https://www.psytoolkit.org/c/3.4.2/survey?s=gEAYm

**AUS**: https://www.psytoolkit.org/c/3.4.2/survey?s=3n2PF

## Appendix P – Twitter / X and LinkedIn Hashtags Used for Recruitment

#SpeechAndLanguageTherapist

#SpeechAndLanguagePathologist

#Stroke

#Aphasia

#DidYouKnow

#UK

#Australia

#MySLTDay

#Depression

#SLT2B

#SLP2B

#SpeechPathologists

#SLP

#InterprofessionalEducation

#StrokeAwarenessMonth

#LetsTalkAphasia

#SLT

#SpeechAndLanguageTherapists

#SLTs

#SLPeeps

#WeSpeechies

#WeAHPs

#AphasiaAwarenessMonth

#SpeechAndLanguageTherapy

#SpeechPathology

#MySPday

#ClinPsyD

## Appendix Q – List of All Societies, Organisations, Universities and Groups Contacted for Recruitment

UK Societies and Organisations:

Royal College of Speech and Language Therapists (RCSLT)

BPS Division of Neuropsychology

ABI Clinical Excellence Network

Stroke Association

Centre for Speech and Language Intervention Research

British Aphasiology Society

Clinical Academics in SLT

Organisation for Psychological Research in Stroke

Association of Speech and Language Therapists in Independent Practice

UK Universities (undergraduate and postgraduate level accredited by the RCSLT):

Anglo-European College of Chiropractic – MSc

Birmingham City University – BSc and MSc

Canterbury Christ Church University – BSc and MSc

Cardiff Metropolitan University – BSc

City, University London – BSc and MSc

DeMontfort University – BSc

University of Central Lancashire – MSc

University of East Anglia – BSc and MSci

University of Essex – BSc and MSc

University of Greenwich – BSc

University of Huddersfield – BSc

Leeds Beckett University – BSc and MSc

University of Lincoln – MSc

Manchester Metropolitan University – BSc and MSc

University of Manchester – BSc and MSc

Newcastle University – BSc, MSc and MSLS

Plymouth Marjon University – BSc

Queen Margaret University – BSc, MSc and MSLT

University of Reading – MSc and MSci

University of Sheffield – BmedSci, BSc and MMEdSci

University of Strathclyde – BSc

University College London – MSc

University of Ulster – BSc

Wrexham University - BSc

<u>UK Facebook Groups:</u>

NQP Speech and Language Therapist Support Group

Newly-Qualified Speech & Language Therapists

Speech & Language Therapy – UK

Speech and Language Therapy Society at Leeds Beckett

QMU SLT Society

UEA Speech and Language Therapy Society

UK Speech & Language Therapy Students

UoM Speech and Language Therapy Society

Australian Societies and Organisations:

Speech Pathology Australia (SPA)

Queensland Aphasia Research Centre

Australian Aphasia Association

Australian Aphasia Rehabilitation Pathway

Centre for Research Excellence in Aphasia Recovery and Rehabilitation

Speech Pathologists Email Chats (SPECS)

Speech Pathologists in Adult Rehabilitation (SPAR)

New South Wales Speech Pathology Evidence Based Practice Network

Adult Neurogenic Communication Interest Group

SPA Communication Special Interest Group

Speech Pathology Brain Injury Interest Group

Private Speech Pathologist Association of WA

<u>Australian Universities (undergraduate and postgraduate level accredited by the SPA):</u>

Australian Catholic University (Brisbane) – BSpPath

Australian Catholic University (Canberra) – BSpPath

Australian Catholic University (Melbourne) – BSpPath

Australian Catholic University (Sydney) – BSpPath

Central Queensland University – BSpPath

Charles Darwin University – BSpPath and MSpPath

Charles Sturt University – BSpPath and MSpPath

Curtin University – BSpPath and MSpPath

Edith Cowan University – BSpPath

Flinders University – BSpPath and MSpPath

Griffith University – MSpPath

James Cook University – BSpPath

La Trobe University – BSpPath and MSpPath

Macquarie University – MSpPath

Melbourne University – MSpPath

Southern Cross University (Coffs Harbour) – BSpPath

Southern Cross University (Gold Coast) – BSpPath

University of Canberra – MSpPath

University of Newcastle – BSpPath

University of Queensland – BSpPath and MSpPath

University of Southern Queensland – BSpPath

University of Syndey – BSpPath and MSpPath

University of Technology Sydney – MSpPath

Western Sydney University – BSpPath

Australian Facebook Groups:

Curtin Speech Pathology

Speech Pathologists AUNZ

Speech Pathology Clinical Support

Speech Pathologists in Private Practice Australia