Received: 29 January 2024 | Revised: 22 June 2024 | Accepted: 18 July 2024

DOI: 10.1111/nhs.13151

REVIEW ARTICLE

Nursing & Health Sciences WILEY

# Sense of coherence in stroke: A concept analysis with Rodger's evolutionary approach

Yaqian Liu MSN, RN[1,2] | Angela Y. M. Leung PhD, MHA, BN, RN[1,2] | Terence Lau MSc, RN(Psychiatric)[1] | Jed Montayre PhD, MN, RN[1] | Wenru Wang PhD, RN[3] | Shanshan Wang PhD, RN[1] | Yaqi Huang PhD, RN[1]

[1]School of Nursing, The Hong Kong Polytechnic University, Hong Kong SAR, China

[2]Research Institute for Smart Ageing, The Hong Kong Polytechnic University, Hong Kong SAR, China

[3]Alice Centre for Nursing Studies, National University of Singapore, Singapore

**Correspondence**
Angela Y. M. Leung, School of Nursing, The Hong Kong Polytechnic University, Room GH528, Hung Hom, Kowloon, Hong Kong SAR, China.
Email: angela.ym.leung@polyu.edu.hk

## Abstract

Sense of coherence (SoC) refers to how individuals cope with stress and maintain health, yet its concept remains no consensus about how it is defined and applied in the context of stroke care. This study aims to clarify the concept of SoC by reviewing its applications in various stroke populations and its changes across different stages of stroke. The adapted steps of Rodger's evolutionary approach of concept analysis were used to explore the attributes, surrogate or related terms, antecedents, and consequences of SoC in stroke. Twenty-five articles were included after evaluating 1065 records and 80 full-text articles. The SoC's attributes, characterized with dynamicity of comprehensibility, manageability, and meaningfulness in stroke, lie within the different stroke phases (acute, sub-acute and chronic). There is no surrogate term to SoC. Related terms included coping, resistance resources, resilience, hardiness, and readiness. Antecedents related to stroke survivors and informal caregivers included sociodemographic factors, body functioning factors, social factors, stroke-related factors, and caring factors. Consequences for stroke survivors, informal caregivers, and dyads included psychological status, health behavior, marital satisfaction, care provision, and perception of rehabilitation needs. The findings of the concept analysis of SoC in stroke reveal that this concept extends beyond survivors experienced stroke, and its comprehensive understanding needs considering various aspects including the SoC of informal caregivers, dyads, and family. This paper serves as a novel perspective for future stroke care, focusing on the needs for dynamic monitoring and adaptations to changes of SoC at different stages of stroke care. A proper understanding of SoC can also contribute to developing assessment tools and theoretical models in stroke care with some emphasis on the phases of strokes (attributes), demographic

Registration of clinical trial and registration identification number: This is a concept analysis based on the literature and does not involve the registration of clinical trials.

and functional characteristics (antecedents), and both stroke survivor–caregiver-related outcomes sensitive to SoC.

KEYWORDS
concept analysis, nursing, sense of coherence, stroke

**Key points**

- This study explores the concept of sense of coherence from the perspectives of stroke survivors, their informal caregivers and families across acute, subacute, and chronic phases of stroke.
- It clarifies the operational definition of sense of coherence used in stroke populations and highlights the importance of focusing on different attributes during three stroke phases.
- This study provides a conceptual framework of sense of coherence in stroke by summarizing its antecedents, attributes, and consequences.

## 1 | INTRODUCTION

Stroke, also known as apoplexy or cerebrovascular accidents, is a common chronic cerebrovascular disease with high prevalence, mortality, recurrence, and long-lasting disability (Feigin et al., 2021; Sacco et al., 2013). Nursing in stroke encompasses the full continuum of medical, rehabilitation, and support services, involving active participation from patients, informal caregivers, and healthcare professionals (Mountain et al., 2020). The long-term care required for stroke patients places significant psychosocial and emotional stress on patients, informal caregivers, and families (Ribeiro de Souza et al., 2022). Studies indicate that stroke patients, especially older adults, experience higher levels of stress and depression compared with the general population, with post-stroke depression rates ranging from 23% to 79% (Ghosh & Adhikari, 2021; Medeiros et al., 2020). Informal caregivers, often unpaid family members or friends, play a crucial role in long-term care (Lou et al., 2017), often spending over 20 h a week on caregiving duties (Perrin et al., 2008; Pugh et al., 2022). This substantial caregiving load leads to high levels of burnout, depression, and physical illness among caregivers (Jaracz et al., 2014; Jaracz et al., 2015; Oliva-Moreno et al., 2018; Perrin et al., 2008; Zhu & Jiang, 2018). From a holistic perspective, stroke affects the entire family, causing considerable stress due to the significant life changes it necessitates (Kitzmüller et al., 2012). This stress is further exacerbated for low-income urban stroke families due to scarce resources (Pierce, 2001). Therefore, there is a pressing need to address and alleviate the stress experienced by stroke survivors, informal caregivers, and families.

Sense of coherence (SoC) is an increasingly popular topic in positive psychology, widely used in clinical and health psychology as an indicator of psychological resilience or health maintenance to explain how people in high-stress situations can either maintain their health or develop pathology (Bachem & Maercker, 2018). During the COVID-19 pandemic, SoC was found to have an inverse association with anxiety in the older adult population (Leung et al., 2022). As a core concept in the "salutogenic model of health" theory introduced by Antonovsky in 1979 (Antonovsky, 1979), SoC was defined as "A global orientation that expresses the extent to which one has a pervasive, enduring through dynamic feeling of confidence that (1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable, and explicable; (2) the resources are available to meet the demands posed by these stimuli; and (3) these demands are challenges, worthy of investment and engagement" (Antonovsky, 1987). The SoC concept consists of three fundamental elements: comprehensibility, manageability, and meaningfulness (Eriksson, 2022). Comprehensibility pertains to the belief that stimuli originating from one's internal and external surroundings are ordered, structured, and predictable, which is the perception of understanding what happens when a person is exposed to a stressful stimulus. Manageability refers to the individual's appraisal of having available resources and the ability of using these resources to handle life challenges. Meaningfulness, a motivational component of SoC, refers to the extent to which individuals perceive the challenges as deserving of emotional engagement and energy investment (Eriksson, 2022).

Exploring SoC in stroke from the perspectives of stroke survivors, caregivers, dyads, and families is crucial due to the interconnected nature of their experiences and coping mechanisms. For stroke survivors, SoC is vital in addressing the significant challenges in physical, cognitive, and emotional domains, thereby enhancing their psychological well-being and recovery outcomes (Guo et al., 2018; Hjelle et al., 2019). Similarly, informal caregivers, who often experience high levels of stress, burnout, and depression, benefit from a strong SoC, which is associated with better coping mechanisms and lower caregiver burden (Chumbler et al., 2004; Perrin et al., 2009). Furthermore, in stroke dyads, the reciprocal relationship between the patient and the primary caregiver significantly impacts each partner's SoC. Studies indicate that a higher SoC in one partner can positively influence the other, leading to improved mutual adjustment and overall well-being (Nilsson et al., 2001). Additionally, the impact of stroke extends to the entire family unit. Higher family SoC is linked to better overall family functioning and mental health, thereby reducing the negative effects of stroke on family members (Hsiao et al., 2018; Pierce, 2001).

Therefore, a comprehensive assessment of SoC across these groups is essential for developing effective interventions and support strategies, ultimately improving the quality of life for all individuals affected by stroke.

However, with the increased utilization of SoC in stroke-related population, the range of methods and elements used in SoC has also expanded and changed. Among stroke survivors, Guo et al. (2018) defined SoC as a dynamic life view of stroke patient and the ability of coping with stressful situations, which may be improved with medical treatment and specific interventions in stroke. This definition differs from the previously recognized concept of SoC as a stable characteristic (Antonovsky, 1979; Van Puymbroeck & Rittman, 2005) which used the SoC of informal caregiver as an indicator of coping ability to explore its relationship with caregiver burden and depressive symptoms. However, Antonovsky, who developed the concept of SoC, emphasized that it is not a specific coping strategy but a flexible choice of appropriate behaviors (Antonovsky & Sourani, 1988). Additionally, in the literature on stroke dyads (survivor–informal caregiver pair) and families, the term "SoC" has been misinterpreted as a personal trait with coping (Nilsson et al., 2001; Perrin et al., 2009; Van Puymbroeck & Rittman, 2005), resilience (Van Puymbroeck & Rittman, 2005), and hardness (Van Puymbroeck & Rittman, 2005). This has led to conceptual confusion due to its interchangeable and overlapping use in the context of stroke.

To comprehend the concept of psychological status, it is crucial to explore its attributes, antecedents, and consequences, and to consolidate its definition. Rodgers and Knafl (1993) suggest that a concept is shaped by various factors across cultures, disciplines, and target populations, and has evolved over time (Rodgers & Knafl, 1993). However, there is no clear definition of SoC in the context of stroke, and the antecedents and consequences have not been synthesized. Hence, the SoC concept must encapsulate its essential components and demonstrate distinct features in stroke, differentiating it from related concepts like coping in stroke care.

This study aims to clarify the concept of SoC in stroke by examining its applications across stroke survivors, families, dyads, and families during acute, subacute, and chronic phases of stroke.

## 2 | METHODS

### 2.1 | Rodger's evolutionary method in concept analysis

Concept analysis is an effective approach to clarifying and distinguishing the meanings of ambiguous concepts across multiple disciplines (Rodgers & Knafl, 1993). It involves identifying the essential properties, analogies, uniqueness, and areas of application of the target concept and comparing it with related concepts or terms by categorizing, managing, tagging, discussing, and summarizing the research of interest (Rodgers et al., 2018; Walker & Avant, 2005). Rodgers' evolutionary method directs this concept analysis of SoC in the stroke population. Acknowledged for its capacity to delineate concept modifications over time and across different contexts, this method is ideal for examining SoC due to its susceptibility to alteration during significant life events, such as a stroke (Andreassen & Wyller, 2005; Rodgers et al., 2018; Rodgers & Knafl, 1993). To explore the SoC dynamics in the context of stroke, this study adapted Rodgers' evolutionary method and added four core stages based on a developing method in nursing science (Tofthagen & Fagerstrøm, 2010), and these steps are detailed in Table 1.

### 2.2 | Search strategies and study selection

Five electronic databases including PubMed, Web of Science, CINAHL complete, Embase, and PsycINFO were searched using the keywords "stroke" and "sense of coherence" to retrieve all publications from January 1979 to December 2023, starting from the year when Antonovsky introduced the concept of SoC (Antonovsky, 1979). Reference lists of included studies and relevant reviews were examined, and the first author collaborated with library staff on search strategy development and database searches (Table 2). Two reviewers independently used the Rayan software to screen the literature, with different labels for inclusion/exclusion, study type, and population classification.

**TABLE 1** Steps of Rodger's evolutionary concept analysis in SoC of stroke.

| Steps | Contents |
|---|---|
| 1. Selecting a concept | Sense of coherence in stroke |
| 2. Choosing the settings, samples, and data sources | Databases: PubMed, Embase, CINAHL complete, PsycINFO, and Web of Science. The data came from different disciplines: Nursing, rehabilitation, and Geriatric Medicine |
| 3. Collecting and managing the data | According to inclusion and exclusion criteria, reading the studies repeatedly. |
| 4. Identifying related terms | See Results |
| 5. Analyzing the data | Code each articles using the labels of surrogate terms, related terms, attributes, antecedent, and consequences. The details are as follows:<br>Surrogate terms—definite words or phrases related to SoC<br>Related terms—phenomena that have some but not all features, such as resilience<br>Attributes—qualities or characteristics of SoC<br>Antecedent—events or experiences that preceded SoC<br>Consequences—outcomes attributable to SoC |
| 6. Identifying a model case | A case will be selected from the sample material. |
| 7. Interpretation of the results and identifying | See Results |
| 8. Further implications | See Discussion |

**TABLE 2** Search strategy example of PubMed database.

| Search number | Query | Results |
|---|---|---|
| 1 | "stroke*"[Title/Abstract] OR "poststroke*"[Title/Abstract] OR "apoplex*"[Title/Abstract] OR "cerebral vasc*"[Title/Abstract] OR "brain vasc*"[Title/Abstract] OR "cerebrovasc*"[Title/Abstract] OR "cva"[Title/Abstract] OR "SAH"[Title/Abstract] | 405,423 |
| 2 | "brain"[Title/Abstract] OR "cerebr*"[Title/Abstract] OR "cerebell*"[Title/Abstract] OR "vertebrobasil*"[Title/Abstract] OR "hemispher*"[Title/Abstract] OR "intracran*"[Title/Abstract] OR "intracerebral"[Title/Abstract] OR "infratentorial"[Title/Abstract] OR "supratentorial"[Title/Abstract] OR "middle cerebral artery"[Title/Abstract] OR "anterior circulation"[Title/Abstract] OR "posterior circulation"[Title/Abstract] OR "basilar artery"[Title/Abstract] OR "vertebral artery"[Title/Abstract] OR "space occupying"[Title/Abstract] OR "ischemi*"[Title/Abstract] OR "infarct*"[Title/Abstract] OR "thrombo*"[Title/Abstract] OR "emboli*"[Title/Abstract] OR "occlusi*"[Title/Abstract] OR "hypoxi*"[Title/Abstract] | 2,931,623 |
| 3 | "putaminal"[Title/Abstract] OR "putamen"[Title/Abstract] OR "posterior fossa"[Title/Abstract] OR "hemispher*"[Title/Abstract] OR "subarachnoid"[Title/Abstract] OR "hemorrhag*"[Title/Abstract] OR "hematoma*"[Title/Abstract] OR "bleed*"[Title/Abstract] | 635,209 |
| 4 | "hemipleg*"[Title/Abstract] OR "hemipar*"[Title/Abstract] OR "paresis"[Title/Abstract] OR "pareses"[Title/Abstract] OR "parapares*"[Title/Abstract] OR "paretic*"[Title/Abstract] | 49,264 |
| 5 | "cerebrovascular disorders"[mesh] OR "basal ganglia cerebrovascular disease"[mesh] OR "brain ischemia"[mesh] OR "carotid artery diseases"[mesh] OR "cerebral small vessel diseases"[mesh] OR "intracranial arterial diseases"[mesh] OR "intracranial embolism and thrombosis"[mesh] OR "intracranial hemorrhages"[mesh] OR "stroke"[mesh] OR "vasospasm, intracranial"[mesh] OR "vertebral artery dissection"[mesh] OR "hemiplegia"[mesh] OR "paresis"[mesh] OR "gait disorders, neurologic"[mesh] | 453,246 |
| 6 | #1 OR #2 OR #3 OR #4 OR #5 | 3,481,236 |
| 7 | "sense of coherence" OR "sense of coherence"[Title/Abstract] OR "Coherence Sense"[Title/Abstract] OR "comprehensibility" [Title/Abstract] OR "manageability"[Title/Abstract] OR "meaningfulness"[Title/Abstract] OR "Salutogenes*"[Title/Abstract] OR "salutogenic*"[Title/Abstract] OR "life orientation*"[Title/Abstract] | 8544 |
| 8 | (#7) AND (#6) AND ("1979/01/01"[Date-Publication]: "2023/12/15"[Date- Publication]) | 420 |

Inclusion criteria were as follows: (a) stroke patients in any phases or their primary and informal caregivers or families; (b) articles focusing on reporting two or more aspects of SoC concept, attribute, antecedent, or consequence; (c) qualitative study providing information related to SoC concept; (d) or quantitative study using multiple regression analysis, stepwise regression analysis, logistic regression analysis, structure equation model, which could identify antecedents (independent variable), and consequences (dependent variables in analysis) (Paige et al., 2018); (e) full-text research in English. Exclusion criteria were as follows: (a) Articles that only reported an isolated aspect of SoC as they did not provide sufficient information to understand the concept in-depth; (b) the statistical methodology of correlation studies cannot indicate dependent variables and independent variables to the extent that they cannot distinguish between antecedents and consequences of SoC (e.g. simple linear analysis); (c) publication type: abstracts, conferences, dissertations, and non-peer-reviewed studies were excluded as their reliability needed verification. Additionally, the outcomes of intervention studies that did not include SoC were also excluded, as they lacked adequate information pertinent for conceptual analysis.

### 2.3 | Data extraction, thematic analysis, and expert consultations

The included studies were all checked by both reviewers at the end of the search by browsing them all from beginning to end. The first author made key field notes and remarks in the first cursory overview of the full text in the included studies, subsequently for in-depth understanding and comments on the highlighted sections, and finally performed information extraction on included studies based on data extraction forms in terms of definitions, attributes, surrogated terms, related terms, antecedents, and consequences (Rodgers & Knafl, 1993; Tofthagen & Fagerstrøm, 2010). Besides, thematic analysis was used to categorize similar findings into attributes, related terms, antecedents, and consequences, making it suitable for conceptual analysis. Once data are saturated and no new information appears, the analysis is complete (Rodgers & Knafl, 1993). Additionally, expert consultation was used to ensure consistency in results and clarify any ambiguities or divergences encountered during the analysis process. This facilitated conceptual analysis and review of the final research results.

## 3 | RESULTS

### 3.1 | Search results

The literature screening process was reported in Figure 1 and resulted in the inclusion of 25 articles after evaluating 1065 records and 80 full-text articles. The target population of stroke was primarily studied in informal caregivers and spouses, with only a few studies reporting on stroke families (Tables 3 and 4).

### 3.2 | Definition of SoC in stroke

Although the original definition of SoC in the included studies is generally quoted from Antonovsky's, 1987 concept (Antonovsky, 1987),

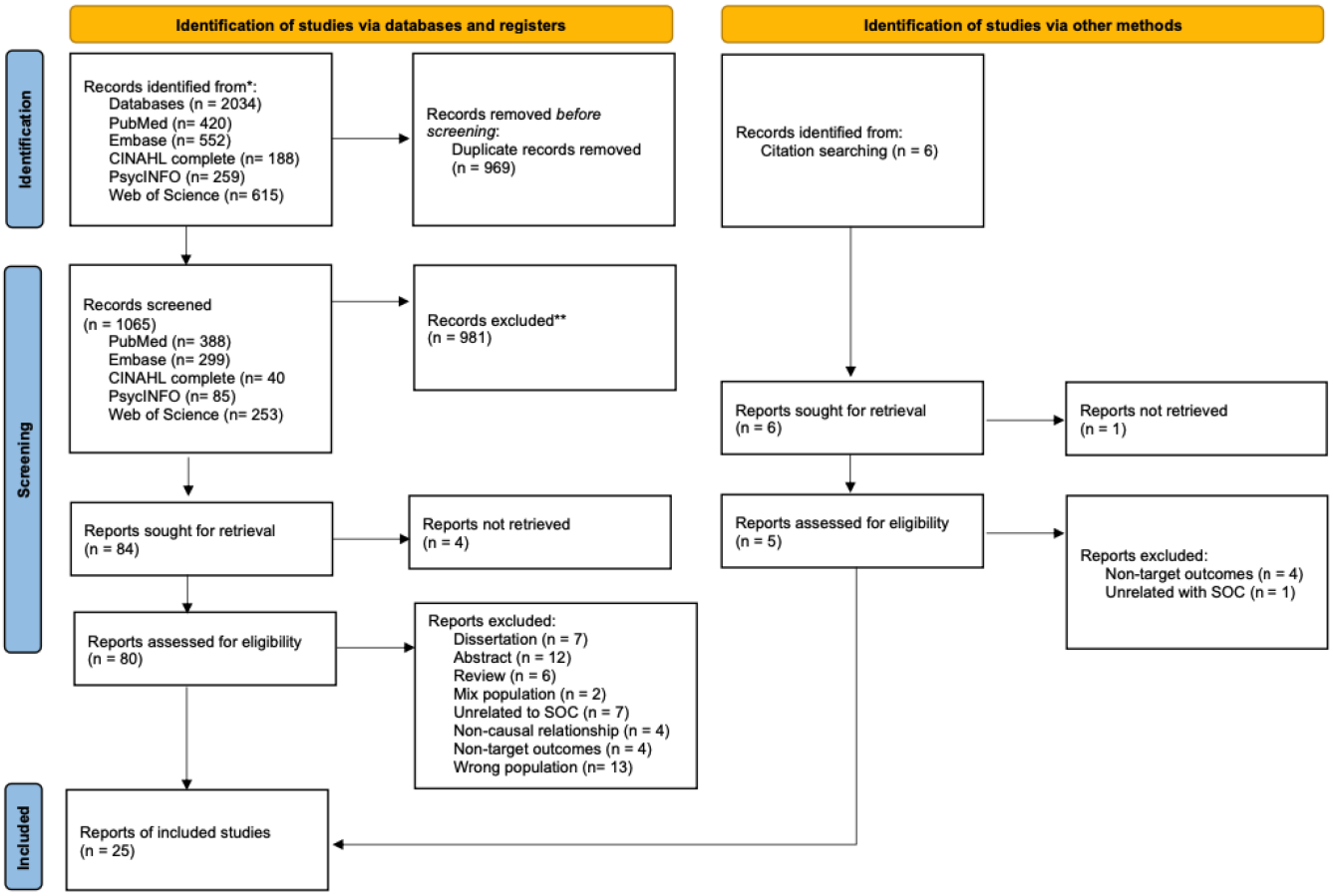


**FIGURE 1** Flow diagram of literature search.

**TABLE 3** Distribution summary of included studies.

| Country | Number of studies | Study type | Number of studies | Stroke target population | Number of studies |
|---|---|---|---|---|---|
| Switzerland | 6 | Qualitative | 2 | Patients | 7 |
| Poland | 3 | Mixed design | 3 | Caregivers and spouses | 12 |
| Norway | 2 | Quantitative | 20 | Dyads | 4 |
| UK | 1 | Cross-sectional | 16 | Stroke families | 2 |
| US | 8 | Cohort | 2 | | |
| China | 2 | Longitudinal | 1 | | |
| Israel | 2 | Randomized Controlled Trial | 1 | | |
| Turkey | 1 | | | | |

some stroke studies have highlighted its specific implications for patients (Andreassen & Wyller, 2005), informal caregivers (Chumbler et al., 2004; Chumbler et al., 2008; Perrin et al., 2009; Van Puymbroeck & Rittman, 2005), dyads (Feigin, 1998; Rena et al., 1996), and families (Perrin et al., 2008; Schünemann et al., 2013) (Table 5). In this study, 'stroke dyads' refer to the mutual and reciprocal relationship between stroke patients and their primary informal caregivers (Feigin, 1998; Rena et al., 1996). The links between stroke dyads and SoC concept highlight that reciprocal relations within stroke dyads influence each partner's SoC differentially during the adjustment processes of stroke recovery (Feigin, 1998, Rena et al., 1996). Feigin (1998) and Rena et al. (1996) found that a higher SoC in either partner positively influences their ability to manage stress, adjust to challenges, and maintain health during stroke. The term "stroke family" encompasses both immediate family members and close friends of stroke survivors (Pierce, 2001). The family' SoC indicated family's collective ability as a whole integrity of coping with the stroke event by providing systematic family resources and caring strategies, or relying on a safety net of support from other family members or close friends (Pierce, 2001). Based on the literature analysis, a precise concept is needed to encapsulate its complex, dynamic nature considering the needs of all participants when a stroke event suddenly strikes. An

**TABLE 4** The characteristics and results of the included studies.

| Author/year | Country | Study design | Discipline | Subjects | Time point of post-stroke | (a) Measurement tool & (b) Scores of SoC | Results |
|---|---|---|---|---|---|---|---|
| Andreassen 2005 | Norway | Qualitative study | Rehabilitation | Patients | 1–2 weeks, 3–5 years | None | Three categories for stoke inpatient rehabilitation: a need for individually tailored information; a need for physical training; and a need for psychological strengthening. |
| Surtees 2007 | UK | Cohort study—prospective | Clinical neurology | Patients | pre-stroke | (a) The health and life experiences questionnaire (3-item SoC)<br>(b) Mean (SD): Women: 1.68 (1.14)<br>Men: 1.96 (1.15) | SoC and stress adaptive capacity (indexed through actual adverse event exposure) are associated with incident stroke.<br>1. SoC was significantly associated with age hypertension treatment, cigarette smoking status, social class, education, hostility, depression, with obesity in women but not in men.<br>2. SoC was not associated either with pre-existing MI, family history of stroke, diabetes or with systolic blood pressure<br>3. A strong (as opposed to a weak) SoC was associated with a 26% reduced rate of incident (fatal and nonfatal) stroke ($p = 0.008$)<br>4. There was no evidence that the association between SoC and stroke incidence attenuated with increasing duration of follow-up ($p = 0.64$ for test of linear interaction with time, adjusted for age and sex)<br>5. increasingly strong SoC was associated with increasingly lower rates of stroke ($p = 0.02$) |
| Tistad 2012 | Sweden | Observational study—prospective | Clinical neurology | Patients | 12-month | (a) SoC-13<br>(b) Median (quartiles): 78 (68,85) | 1. Dissatisfaction with care at 12 months after stroke was predicted by a weak SoC and high impact on the SIS domain participation at 3 months. |
| Van Puymbroeck 2014 | US | Cross-sectional study | Rehabilitation | Patients | ≥9 months | (a) SoC-13<br>(b) Mean (SD, range): 70.9 (13.3, 37–91) | 1. Anxiety was determined to be a significant predictor of sense of coherence, where individuals with lower anxiety had a higher sense of coherence. But depression was not in stroke.<br>2. But SoC did not predict either activity or participation |
| Guo 2018 | China | Cross-sectional study | Geriatrics and Gerontology | Patients | 7–30 days | (a) SoC-13<br>(b) Mean (SD, range):<br>SoC: 74.47 (8.59, 38–90)<br>Comprehensibility: 28.36 (4.30, 8–35)<br>Manageability: 23.05 (3.51, 7–28)<br>Meaningfulness: 23.06 (3.51, 12–28) | 1. Sense of coherence had a (negatively) significant direct effect on depression of stroke patients.<br>2. Perceived stress had a significant direct effect on depression and sense of coherence (negatively associated) of stroke patients.<br>3. 15.5% of the total effect on depression was produced by sense of coherence as a partial mediator.<br>4. SoC of stroke patients is the mediating variable between perceived stress and depression and can reduce the influence of perceived stress on depression. |
| Ytterberg 2020 | Sweden | Cross-sectional study | Neurobiology | Patients | 6-year | (a) SoC-13<br>(b) Not reported | SoC of stroke patients predicts rehabilitation services needs met with stroke incontinence and emotional. |

**TABLE 4** (Continued)

| Author/year | Country | Study design | Discipline | Subjects | Time point of post-stroke | (a) Measurement tool & (b) Scores of SoC | Results |
|---|---|---|---|---|---|---|---|
| Hjelle 2019 | Norway | RCT | Rehabilitation | Patients | T1: 1-month<br>T2: 6-month | (a) SoC-13<br>(b) Mean (SE):<br>T1: 50.4 (0.46)<br>T2: 50.5 (0.52) | 1. SoC of stroke patients did not change significantly from 1 to 6 months post-stroke.<br>2. Higher SoC increased the odds of normal mood, the SoC predicted stroke-specific health-related quality of life. |
| Forsberg-Wärleby 2002 | Sweden | Mixed design | Rehabilitation | Spouses | 2–29 days | (a) SoC-29<br>(b) Mean (SD, range):<br>149.7 (14.4, 115–195) | 1. The mean of the SoC was not significantly lower than the mean of a Swedish urban population.<br>2. The SoC of the spouses is of significance for their coping process in the first phase after stroke.<br>3. The association between SoC of spouses and depressed mood was not statistically significant. |
| Van Puymbroeck 2005 | US | Longitudinal study | Rehabilitation | Caregivers | 1-month, 6-month | (a) SoC-13<br>(b) Not reported | 1. Caregivers in this study had a high SoC at 1 month, which likely buffered the potential deleterious effects of caregiving.<br>2. For the significant findings on the time and SoC interaction, coping ability decreased significantly over 6 months for stroke caregivers, which indicates an important time for intervention on caregivers. |
| Chumbler 2004 | US | Cross-sectional study | Geriatrics and Gerontology | Caregivers | 1-month | (a) SoC-13<br>(b) Mean (SD, range):<br>71.3 (15.0, 26–91) | Caregivers who reported a greater SoC had a fewer number of depressive symptoms. |
| Larson 2005 | Sweden | Observational study—prospective | Nursing | Spouses | 1-year | (a) SoC-13<br>(b) Mean (SD): baseline:<br>68.58 (9.27)<br>6-month post-stroke:<br>68.50 (10.27)<br>12-month post-stroke:<br>70.67 (10.53) | Higher scores for SoC had a negative impact on the spouses' QoL on baseline after patients' stroke event. |
| Van Puymbroeck 2008 | US | Observational study—prospective | Rehabilitation | Caregivers | 1-year | (a) SoC-13<br>(b) Mean (range): 71.51 (26–90) | 1. The sociodemographic variables of stroke patients and caregivers included in this study did not predict sense of coherence of caregivers.<br>2. The sense of coherence was the strongest predictor of burden and depressive symptoms at 12 months post-stroke; strong sense of coherence is predictive of lower burden and depressive symptoms in stroke caregivers. |

(Continues)

**TABLE 4** (Continued)

| Author/year | Country | Study design | Discipline | Subjects | Time point of post-stroke | (a) Measurement tool & (b) Scores of SoC | Results |
|---|---|---|---|---|---|---|---|
| Chumbler 2008 | US | Observational study—prospective | Geriatrics and Gerontology | Caregivers | 2-year | (a) SoC-13<br>(b) Mean (SD):<br>1-month post-stroke: 71.9 (14.5)<br>6-month post-stroke: 71.2 (13.6)<br>12-month post-stroke: 70.6 (11.8)<br>18-month post-stroke: 72.5 (11.2) | 1. SoC may be a good marker for depression, and low SoC scores could be an additional way to identify those who may be at risk for depression if other methods of screening were not available.<br>2. There was a marginally significant interaction between time and SoC ($p = 0.0658$) |
| Perrin 2008 | US | Cross-sectional study | Rehabilitation; Psychology, clinical | Caregivers | 6 months | (a) SoC-13<br>(b) Not reported | Stroke caregivers' burden, depression, and SoC are negatively associated with severity impairment, daily functioning of stroke patients. |
| Perrin 2009 | US | Observational study—prospective | Rehabilitation; Psychology, clinical | Caregivers | 1 month, 6 months, 1 year | (a) SoC-13<br>(b) Mean (SD):<br>1-month post-stroke: 1.34 (14.39)<br>6-month post-stroke: 70.76 (13.45)<br>12-month post-stroke: 70.36 (12.34) | 1. SoC as predictor for mental health of stroke caregiver's: stroke patients' daily functioning and depression are the best 1-month predictors of poor caregivers' mental health 6 and 12 months after discharge (specifically poor sense of coherence and high burden and high depression).<br>2. Caregiver mental health and care-recipient functioning may have reciprocal causal influence on each other. |
| Jaracz 2012 | Poland | Cross-sectional study | Clinical neurology | Caregivers | 6 months | (a) SoC-29<br>(b) Mean: 141 | 1. Caregivers' SoC (the most important) and the level of disability of the patient are two key predictive factors for the negative consequences of caregiving.<br>2. Caregivers' SoC is a mediator between caring burden and stroke patients' functional status. |
| Jaracz 2014 | Poland | Observational study—prospective | Medicine, General and Internal | Caregivers | 6 months | (a) SoC-29<br>(b) Not reported | Caregivers' SoC is strongly associated with caring burden. |
| Jaracz 2015 | Poland | Cohort study—perspective | Social science and interdisciplinary | Caregivers | 6-month, 5-year | (a) SoC-13<br>(b) Mean (SD):<br>6-month post-stroke: 66.3 (12.5)<br>5-year post-stroke: 63.9 (13.7) | 1. Caregivers' SoC could predict caring burden at 6 months, not 5 years, after stroke.<br>2. A low SoC of caregivers proved to be crucial for substantial caregiver burden during the early post-stroke period.<br>3. Caregivers' SoC had a moderate level at 6-month post-stroke and decreased over time ($p = 0.011$) |

**TABLE 4** (Continued)

| Author/year | Country | Study design | Discipline | Subjects | Time point of post-stroke | (a) Measurement tool & (b) Scores of SoC | Results |
|---|---|---|---|---|---|---|---|
| Wu 2015 | China, Taiwan | Observational study—prospective | Nursing | Caregivers | 1 month, 6 months | (a) SoC-13<br>(b) Mean (SD):<br>1-month post-stroke:<br>SoC: 59.59 (11.77)<br>Comprehensibility: 26.63 (5.78)<br>Manageability: 18.32 (4.19)<br>Meaningfulness: 18.63 (3.82)<br>6-month post-stroke:<br>SoC: 58.41 (11.53)<br>Comprehensibility: 21.80 (5.11)<br>Manageability: 17.76 (4.20)<br>Meaningfulness: 18.85 (3.11) | 1.Caregivers with lower SoC had higher depression.<br>2.There is no significant changes in overall SoC of caregivers from 1 to 6 months post-stroke. |
| Nilsson 2001 | Sweden | Mixed design | Nursing | Dyads | 3 months | (a) SoC-29<br>(b) Median (range): 148 (123–171) | 1. Spouses of stroke patients with a weak SoC had greater levels of burden than those with a strong SoC.<br>2. SoC of stroke dyads was negatively with their Well-being and burnout in the first months after stroke. |
| Feigin 1996 | Israel | Cross-sectional study | Social science and interdisciplinary | Dyads | ≥6 months | (a) SoC-29<br>(b) Not reported | SoC of stroke dyads was significantly related to psychological and social functioning, health state of stroke patients with stable disability and their spouses. |
| Feigin 1998 | Israel | Cross-sectional study | Family studies | Dyads | ≥6 months | (a) SoC-29<br>(b) Not reported | 1. Patients with disability had a higher SoC than their spouses were less anxious and healthier than that had a lower SoC than their spouse.<br>2. Spouse had a higher SoC than the disabled partner was less anxious, healthier, more accepting of disability, more highly engaged in work and study activities, higher sense of dependency. |
| Ekstam 2015 | Sweden | Mixed-design study | Medicine, General and Internal | Dyads | 1 year | (a) SoC-13<br>(b) Median (range): 79.5 (69–87.8) | 1. In dyads where rehabilitation needs were met, stroke patients had a higher SoC than those in dyads with discordant views.<br>2. There was no difference regarding SoC found between dyads with met and unmet rehabilitation needs. |
| Pierce 2001 | US | Qualitative study | Rehabilitation | Family | 6 months | NR | 1. Mutuality such that there was a give-and-take process in caring situations of all involved in stroke family, not only for the caregivers and care recipient, but also the whole family and the community family of friends.<br>2. Differences in filial function based on love, duty or obligation of caring relationship with stroke recipients could help to mediate stressful caring situation and maintain the family unit. |

(Continues)

TABLE 4 (Continued)

| Author/year | Country | Study design | Discipline | Subjects | Time point of post-stroke | (a) Measurement tool & (b) Scores of SoC | Results |
|---|---|---|---|---|---|---|---|
| Huseyinsinoglu 2021 | Turkey | Cross-sectional study | Medicine, General and Internal | Family | 5–18 days | (a) FSOC-S (12 items)<br>(b) Not reported | FSOC is not related with caregivers' caregiving outcomes, anxiety. |

Abbreviations: FSOC, family sense of coherence scale-short form (FSoC-S) (Sagy, 1998); FSOC-S, family sense of coherence scale-short form; SD, standard deviation; SE, standard error; SoC-13, sense of coherence scale-13 items (SoC-13) (Antonovsky, 1987); SoC-29, sense of coherence scale-29 items (SoC-29) (Langius et al., 1992).

updated definition of SoC in stroke is proposed as "a dynamic appraisal of the whole circumstances in which it is situated when a stroke event strikes in life, the ability to cope confidently with stress, and the psychological tendency to seek out the resources available." This concept emphasizes that SoC is not only applied in the individuals, such as including stroke survivors and their informal caregivers, but also in the interpersonal relationship of stroke dyads (informal caregiver-survivor) and even the entire family. SoC in stroke is embedded and changed throughout the different stages of stroke, reflecting the adaptive processes and coherence of all those affected.

### 3.3 | Attributes of SoC in stroke

Attributes refer to the characteristics, elements, or components of a concept, the ability to identify the properties that can be categorized under the concept (Tofthagen & Fagerstrøm, 2010). Three domains of attributes in SoC for stroke, as identified in literature studies, are primarily comprehensibility, manageability, and meaningfulness. These domains are relevant to stroke patients, informal caregivers, dyads, and families, each of which is separately focused on different stroke phases. According to standard recommendation of stroke recovery trial (Kwakkel et al., 2017), stroke phases are defined as pre-stroke (6 months prior), acute (±2 weeks from stroke), subacute (3–6 months post-stroke), and chronic (more than 6 months post-stroke) (Figure 2 & Table 5).

Comprehensibility, manageability, and meaningfulness are distinguished according to the different stages of stroke, each of which includes stroke survivors, informal caregivers, and dyads. In the early phase of the disease, comprehensibility for stroke patients could be emphasized to improve health education about stroke (Andreassen & Wyller, 2005). For informal caregivers, comprehensibility involves viewing future situations that will be encountered after a stroke event as predictable, ordered, and explicit (Chumbler et al., 2008). This is a key concern, as providing ample information and communication between healthcare workers and caregivers during the hyperacute or acute stroke phase is crucial (Van Puymbroeck et al., 2008). Regarding stroke dyads, comprehensibility and meaningfulness are addressed by having patients provide their partners with a comprehensive perspective on the stressful disability situation (Rena et al., 1996). This approach helps strengthen their relationship and encourages the use of available resources to respond positively. Consequently, this can lead to a more meaningful life as both partners are motivated by the desire to prove their abilities and adapt effectively.

As the stages progress, manageability becomes particularly important. For stroke survivors, manageability may be crucial in the newly diagnosed disability phase to allow them to engage in more recovery training. For informal caregivers, manageability refers to their capacity to handle the stress of caregiving (Chumbler et al., 2008). This focus should be on providing caregivers with various options related to available community resources and empowering them to feel like a significant part of decision-making during the subacute stroke phase (Van Puymbroeck et al., 2008). In stroke dyads, informal caregiver's

**TABLE 5** The concept, attributes, related terms, antecedents, and consequences of sense of coherence in stroke.

| Author/year/ Stroke phase | Concept | Attributes | Related terms | Antecedents | Consequences |
|---|---|---|---|---|---|
| Andreassen 2005<br>Acute, chronic | GD: Antonovsky 1987; SoC as a stable trait and expected no more dramatic changes to take place after the age of 30.<br>SD: SoC is open to change, particularly after major life events which may be affected by the individual's choice of coping techniques positively or negatively.<br>SoC in stroke is a dynamic concept, one might speculate that in the context of rehabilitation the three components of SoC are related to different phases and whether the disease is progressive or starts acutely. | COM: In an early phase of a progressive disease, comprehensibility will be focused.<br>MA: In relation to a newly diagnosed disability, manageability may be more important.<br>ME: when disabilities have stayed for several years, meaningfulness will become the center of attention. | NR | NR | NR |
| Surtees 2007<br>Pre-stroke | GD: Antonovsky 1987 | COM, MA, ME | Stress adaptive capacity | Significant: age, hypertension treatment, cigarette smoking status, social class (general's occupation-based classification), education, hostility, depression, with obesity in women but not in men<br>Nonsignificant: pre-existing myocardial infarction, family history of stroke, diabetes, systolic blood pressure | incident rate of fatal or nonfatal stroke with or without time |
| Tistad 2012<br>Chronic | GD: A weak SoC is thought to be related to poor ability to mobilize emotional, intra- and interpersonal resources as well as material resources to cope with a problem, also includes the abilities of the person's social network as potential resources. | COM, MA, ME | NR | NR | Dissatisfaction with care at 12 months |
| Van Puymbroeck 2014<br>Chronic | GD: the ability of the individual to mobilize coping resources in times of stress and the ability to understand the stressor as comprehensible, manageable, and meaningful. | NR | NR | Stroke patients' depression, anxiety | NR |
| Guo 2018<br>Acute | GD: It is a personal way of thinking, being, and acting, with an inner trust, which leads people to identify, benefit, use, and reuse the resources at their disposal.<br>SD: SoC is more dynamic than formerly believed and empirical evidence reveals that SoC of stroke patients may be improved due to a mode of therapy. | COM, MA, ME | NR | Perceived Stress | stroke patients' depression |

(Continues)

**TABLE 5** (Continued)

| Author/year/ Stroke phase | Concept | Attributes | Related terms | Antecedents | Consequences |
|---|---|---|---|---|---|
| Ytterberg 2020 Chronic | NR | COM, MA, ME | NR | NR | Rehabilitation services needs met with stroke incontinence; rehabilitation services needs met with stroke emotional |
| Hjelle 2019 Acute, subacute | NR | COM, MA, ME | NR | NR | Stroke-specific health-related quality of life, normal mood. |
| Forsberg-Wärleby 2002 Acute | GD: a personal disposition, a global orientation to life, and is assumed to have its origin in the individual's socio-cultural context from which his/her internal and external General Resistance Resources (GRR) are built up. | COM, MA, ME | Coping | NR | NR |
| Van Puymbroeck 2005 Acute, subacute | GD: Antonovsky 1987<br>SD: The SoC concept really is "a global orientation" of coping. It is not a specific coping strategy but rather the mobilization of coping and adaptive resources that decrease the deleterious effects of stress in stroke. | COM, MA, ME | Resiliency, hardiness | Stroke survivor characteristics: functional status, personal income<br>Caregiver characteristics: race/ethnicity, relationship to stroke survivor | caregivers' QoL: sense of competence (burden), dissatisfaction with care recipient, dissatisfaction with performance as caregiver, negative consequences in personal life of caregiver, depression |
| Chumbler 2004 Acute | GD: SoC is a comprehensive measure of coping resources in that it is an indicator of the availability of, and readiness to use, adaptive coping resources; SoC essentially remains stable throughout adulthood.<br>SD: SoC of stroke caregivers may act as a resistance to burden and depressive symptom. | COM, MA, ME | Coping, resistance, readiness, adaptive coping resources | NR | Caregiver burden, caregiver depressive symptoms |
| Larson 2005 Chronic | NR | NR | NR | NR | Spouses' QoL |
| Van Puymbroeck 2008 Chronic | GD: SoC focuses on one's ability to solve problems and utilize resources in the environment to solve these problems. | COM: ample amounts of information and communication between health care workers and the caregiver.<br>MA: provide the caregiver with a variety of options related to resources available in the community and empowering them to feel like a major part of the decision-making in the care of their loved one.<br>ME: provide the caregiver with comfort and assisting them with increasing components of hope. | Resilience, hardiness | NR | Caregivers' burden, depressive symptoms |

**TABLE 5** (Continued)

| Author/year/ Stroke phase | Concept | Attributes | Related terms | Antecedents | Consequences |
|---|---|---|---|---|---|
| Chumbler 2008 Chronic | GD: SoC is an orientation to life that can help avert emotional/psychological distress in stressful situations by appropriate coping strategies.<br>SD: SoC of stroke caregivers can be employed as an appraisal of caregivers' ability to mobilize resources to handle the stroke patient's illness. | COM: the circumstances that they will encounter in the future is viewed as predictable, ordered, and explicit.<br>MA: they have the capacity at their disposal to deal with the stress of caregiving.<br>ME: the problems and demands of caregiving are viewed as challenges instead of burdens. | Coping response | NR | Caregiver depression |
| Perrin 2008 Subacute | GD: Antonovsky 1987 | COM, MA, ME | Coping | Caregivers psychological functioning, depression, burden | NR |
| Perrin 2009 Subacute | GD: Antonovsky 1987<br>SD: "sense of coherence" has come to mean "coping," and can be seen as "a measure of an individual's resistance in the face of stress" in stroke. | COM, MA, ME | Coping | NR | Caregiver mental health—burden, depression |
| Jaracz 2012 Subacute | GD: Antonovsky 1987 | COM, MA, ME | Coping resource | Patient characteristics: age, sex, functional status, emotional state caregiver characteristics: age, sex, presence of illnesses, social support, time spent on caregiving | Caregiver emotional state, caregiver burden |
| Jaracz 2014 Subacute | GD: Antonovsky 1987 | NR | Global life orientation | NR | Caregivers' burden: disappointment, emotional involvement, general strain |
| Jaracz 2015 Subacute, chronic | GD: Antonovsky 1987 | NR | Inner stress-coping resources | NR | Caregivers' burden at 6 months after stroke |
| Wu 2015 Acute, subacute | GD: Antonovsky 1987 | COM, MA, ME | NR | NR | Caregiver depression |
| Nilsson 2001 Subacute | GD: Antonovsky 1987; SoC is devoid of value judgments and simply reflects an individual's coping with difficult situations. | COM, MA, ME | Coping | NR | Well-being, burnout |
| Feigin 1996 Chronic | SD: SoC of stroke dyads enables patient and caregivers to cope in an irreversible situation such as disability, by viewing it as comprehensible, manageable, and meaningful. | COM, ME: Patients of stroke dyads contributes a meaningful and comprehensive perception of the stressful disability situation to the stroke dyads' relationship, and use the available resources around them to respond positively, thus making their lives more | NR | NR | Patients' personal level: anxiety, health<br>Spouses' personal level: anxiety, health, disability acceptance<br>Spouses' Marital level-relative vulnerability (fear of separation, sense of dependence), marital satisfaction |

(Continues)

**TABLE 5** (Continued)

| Author/year/ Stroke phase | Concept | Attributes | Related terms | Antecedents | Consequences |
|---|---|---|---|---|---|
| | | meaningful as they are motivated by their need to prove their abilities.<br>MA: caregivers of stroke dyads contributes a manageable perception that their functioning is motivated by the belief that the stressful disability situation can be managed | | | Spouses' social environmental level-social activities, work and study hours |
| Feigin 1998<br>Chronic | GD: A way of viewing one's world and posing problems which can be managed.<br>SD: SoC of both partners is an existing reciprocal relationship, decided by the SoC of the disabled person with stroke. | COM, MA, ME | Internal coping resource | NR | Patients' or spouses' personal level: anxiety, health<br>Patients' or spouses': anxiety, health, disability acceptance<br>Patients' or spouses' Marital level: relative vulnerability (fear of separation, sense of dependence), marital satisfaction<br>Patients' or spouses' social environmental level: social activities, work and study hours |
| Ekstam 2015<br>Chronic | NR | COM, MA, ME | NR | NR | Perception of rehabilitation needs |
| Pierce 2001<br>Subacute | GD: family coherence, targets stability of the family and its outcome is a sense of unity and belonging to the family system. | Mutuality, differences in filial functioning | NR | NR | NR |
| Huseyinsinoglu 2021<br>Acute | GD: family coherence, the family's appraisal of the overall circumstances, particularly, the family's fit within the community in which it lives, its sense of manageability about life events, the predictability about circumstances, and the sense of control and trust the family has over present and future events. | COM, MA, ME | NR | NR | NR |

*Note*: Stroke phases in terms of standard recommendation of stroke recovery trial (Kwakkel et al., 2017): pre-stroke period: 6 months pre-stroke; acute stroke period: ±2 weeks from stroke date; subacute stroke period: within the first 3–6 months post-stroke; chronic post-stroke period: more than 6 months post-stroke.

Abbreviations: COM, comprehensibility means the interpretation of the world as rational, understandable, structured, ordered, consistent and predictable (Antonovsky, 1987); GD, general definition; MA, manageability means the belief that resources will be personally available to cope with demands and problems (Antonovsky, 1987); ME, meaningfulness means the appraisal of the situation as challenging and that it is worth making investments to cope with it (Antonovsky, 1987); SD, stroke definition.

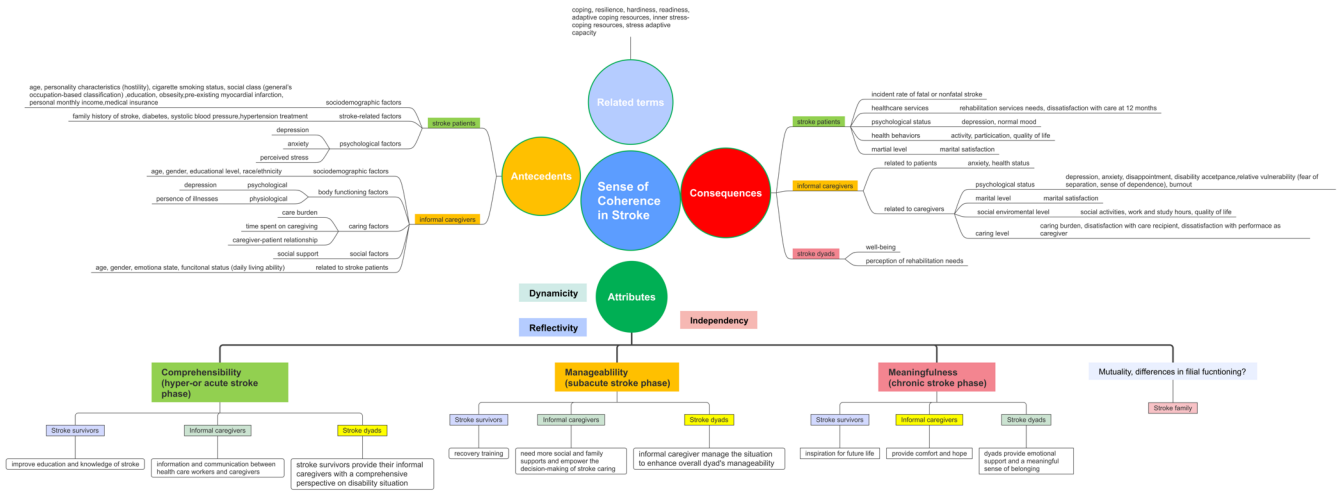


**FIGURE 2** The concept mapping of sense of coherence in stroke.

contributions toward managing the situation can enhance the dyad's overall sense of manageability, leading to a more successful adjustment as a cohesive unit (Rena et al., 1996).

Finally, meaningfulness becomes central in the chronic phase. For stroke survivors, this could involve finding inspiration for future life despite long-term disabilities (Andreassen & Wyller, 2005). For informal caregivers, meaningfulness is about viewing caregiving demands as challenges rather than burdens (Chumbler et al., 2008). This perspective should be valued for bringing comfort and hope to caregivers during the chronic stroke phase (Van Puymbroeck et al., 2008). For stroke dyads, the meaningfulness aspect is reinforced by the comprehensive understanding of the disability situation, which motivates both partners to respond positively and maintain a meaningful life together (Rena et al., 1996).

For stroke families, two key characteristics of SoC have been newly identified (Pierce, 2001). First, the mutuality emphasizes the importance of a reciprocal caring process involving all members of the stroke family, including informal caregivers, care recipients, extended family, and community friends. Second, differences in filial function based on love, duty, or obligation can serve as a mediator in stressful caring situations and help to maintain the family unit (Pierce, 2001).

## 3.4 | Antecedents of SoC in stroke

Antecedents are events or phenomena previously associated with the concept (Tofthagen & Fagerstrøm, 2010). Antecedents of SoC in stroke were reported on sociodemographic factors, stroke-related factors, social factors, and body function factors, and caring factors of stroke patients and informal caregivers, respectively (Table 5 & Figure 2).

Common sociodemographic factors such as age, gender, education level, and income may influence the level of SoC in individuals experiencing a stroke event (Jaracz et al., 2012; Surtees et al., 2007). For stroke patients, the EPIC-Norfolk Prospective Cohort Study of incident stroke indicates that SoC was significantly associated with age, hypertension treatment, cigarette smoking status, social class, education, hostility, depression, obesity in women, but not associated either with pre-existing MI, family history of stroke, diabetes, or with systolic blood pressure (Surtees et al., 2007). In addition, perceived stress and negative emotions such as anxiety and depression also predict SoC, where individuals with lower levels of stress perception, anxiety, and depression have a higher sense of consistency (Guo et al., 2018; Van Puymbroeck et al., 2014). This is inconsistent with Tistad's findings that depression did not predict SoC of patients (Tistad et al., 2012). Conversely, for informal caregivers, stroke patients' function status and income, informal caregivers' ethnicity, and patient–caregiver relationship were not significantly associated with their SoC at 1-and-6-month post-stroke (Van Puymbroeck & Rittman, 2005), which is consistent with Jaracz's findings (Jaracz et al., 2012). However, informal caregivers' psychological functioning (depression) and caregiving burden negatively predicted their SoC, while patients' functional status, informal caregivers' illness performance, and social support had a positive effect (Jaracz et al., 2012; Perrin et al., 2008).

## 3.5 | Consequences of SoC in stroke

Consequence is the result of the concept being used in an actual situation (Tofthagen & Fagerstrøm, 2010). Consequences of SoC in stroke were reported in stroke patients, informal caregivers, and dyads presented in conceptual mapping (Table 5 & Figure 2).

For stroke patients, high SoC reduces lower incidence rate of stroke events when adjusted for sociodemographic factors other than gender (Surtees et al., 2007). A weak SoC of stroke patients could predict the dissatisfaction with care at 12 months post-stroke (Tistad et al., 2012). Meanwhile, their SoC also predicts the need for rehabilitation services related to stroke incontinence and emotional issues for up to 6 years post-stroke (Ytterberg et al., 2020). Patients with a high SoC had low levels of anxiety, depression, increased odds of normal

mood, and improved stroke-specific health-related quality of life (Guo et al., 2018; Hjelle et al., 2019; Van Puymbroeck et al., 2014).

For informal caregivers, decreased SoC could negatively affect their quality of life, caregiving burden, dissatisfaction with their own caregiving performance, and care recipient (Van Puymbroeck & Rittman, 2005), as well as their depression and burnout (Nilsson et al., 2001). Of greater concern is that informal caregivers' SoC was the strongest predictor of caregiving burden and their depression at 12 months post-stroke (Van Puymbroeck et al., 2008). Spouse as informal caregivers had a higher SoC than stroke patients, being less anxious, healthier, more accepting of disability, more engaged in work and study activities, and having higher sense of dependency; however, there were no significant differences in marital satisfaction between stroke patients and informal caregivers (Feigin, 1998; Rena et al., 1996).

For stroke dyads, their SoC was negatively associated with their well-being and burnout in the first month post-stroke (Nilsson et al., 2001). Besides, stroke dyads whose rehabilitation needs were met had a higher SoC than those with discordant views, while no difference in SoC was found between dyads with met and unmet rehabilitation needs at 1 year post-stroke (Ekstam et al., 2015).

It is also of interest that SoC mediated the relationship between perceived stress and depression in stroke survivors (Guo et al., 2018), as well as informal caregivers' social support and care burden and emotional state, and patients' functional status (Jaracz et al., 2012).

### 3.6 | Surrogate terms and related terms

Surrogate terms have the same meaning as the target concept and can be interchanged, while related terms share some common ground with the concept, but not all of its defining characteristics (Tofthagen & Fagerstrøm, 2010). No surrogate terms for SoC in stroke were found in the included studies (Table 5). While "life orientation" may have initially been considered as a substitute, the available database searches show that the life orientation scale measures "optimism," which does not align with the key attributes of SoC. However, related terms of SoC in stroke included coping (Chumbler et al., 2004; Chumbler et al., 2008; Forsberg-Warleby et al., 2002; Jaracz et al., 2012; Nilsson et al., 2001; Perrin et al., 2008; Perrin et al., 2009), resilience (Van Puymbroeck et al., 2008; Van Puymbroeck & Rittman, 2005), hardiness (Van Puymbroeck et al., 2008; Van Puymbroeck & Rittman, 2005), readiness (Chumbler et al., 2004), adaptive coping resources (Chumbler et al., 2004), inner stress-coping resources (Feigin, 1998; Jaracz et al., 2015), and stress adaptive capacity (Surtees et al., 2007).

### 3.7 | Case example

Case examples are practical illustrations of concepts derived from data material, rather than ideal or model cases, and provide a more comprehensive portrait of the concept (Tofthagen & Fagerstrøm, 2010). Representative cases on SoC's comprehensibility, manageability, and meaningfulness of stroke survivors were selected from the qualitative studies as complete cases did not appear in the included studies.

Case 1 represents the need for more education and increased knowledge for patients experiencing the acute phase of stroke to comprehend their illness:

A 63-year-old male, who experienced a stroke 3 weeks ago, suffered paralysis in his right arm, paresis in his right leg, and mild aphasia. His medical presentation was recorded through the nurse in the emergency medicine department as follows.

> When I came here, I was like a big question mark as I tried to figure out what my situation was. Living blood, I'm probably approaching the worst of times now and maybe I won't manage to get out of the house. I don't know, I didn't know anything about the disease until I got sick.
>
> (Andreassen & Wyller, 2005)

Case 2 reports on patients in the subacute phase who wanted more training to manage their damaged physical rehabilitation.

A middle-aged woman was diagnosed with a stroke with left-sided hemiparesis, able to walk independently but with an unsteady gait, and suspected but not diagnosed with minor cognitive impairment. In her inpatient rehabilitation records for about 5 months, she was described by her physiotherapist as follows:

> I want to become more independent. There is nothing in particular that I want to do here, just to be able to manage normally at home and outside. Retraining the arms and legs.
>
> (Andreassen & Wyller, 2005)

Case 3 describes a patient in chronic stroke who wanted more motivation and a new perspective on life from talking to other patients suffering from the same problems, thus making life more meaningful in the future.

A middle-aged woman who has been experiencing disability for more than 30 years, her husband wrote down her daily experience as follows:

> I'm just trying to pick up a bit more of life. I've been in training before. You might feel so frustrated that it's like climbing a huge tree and you don't feel like doing more. It's simply the joy of life that will last.... You won't motivate yourself, that's useless. So you have to get the impulse from other people.
>
> (Andreassen & Wyller, 2005)

## 4 | DISCUSSION

SoC is a complex concept with its variation and misinterpreted as other related terms in stroke. It is a crucial factor in reducing stress

and enhancing positive emotions in stroke (Guo et al., 2018). Individuals with high SoC levels are better equipped to handle adverse events and promote their physical and mental well-being (Chumbler et al., 2004; Guo et al., 2018). With stroke events increasing each year, healthcare providers should be reminded that a focus on SoC is an unignorable aspect of ensuring the physical and psychological well-being of those affected by stroke events. Simultaneously, stroke patients and stroke-affected population should also increase their aware of what SoC is, what affects it, and what outcomes can result from a decline in SoC. The resulting increase in stroke events and greater awareness of SoC may provide opportunities for health providers to discuss SoC in the context of stroke. Sharing the SoC experiences is important in stroke care because it provides a platform for stroke patients and their caregivers to open up about their ongoing experiences and challenges, while also offering healthcare providers opportunities to discuss the standard of care in stroke. This may provide a potential way for more exploration of the SoC and related research for stroke.

The attributes of SoC in stroke are characterized by dynamicity, reflectivity, and independency. For dynamicity, SoC levels are not stable across all stroke phases and vary among different populations affected by stroke. Stroke patients typically exhibit moderate SoC during the acute phase, which decreases to low levels in the subacute phase and increases again to moderate or high levels in the chronic phase (Guo et al., 2018; Hjelle et al., 2019; Tistad et al., 2012; Van Puymbroeck et al., 2014). Informal caregivers generally maintain moderate or high SoC levels throughout all phases, although their SoC may slightly decline over time (Chumbler et al., 2004; Chumbler et al., 2008; Ekstam et al., 2015; Forsberg-Warleby et al., 2002; Jaracz et al., 2012; Jaracz et al., 2015; Larson et al., 2005; Nilsson et al., 2001; Perrin et al., 2009; Van Puymbroeck et al., 2008; Wu et al., 2015). Specifically, there may not be significant changes in informal caregivers' SoC from acute to subacute stroke phase (Wu et al., 2015), while had a moderate level at 6-month subacute stroke phase and decreased overtime until chronic stroke phase (Jaracz et al., 2015). In stroke dyads, SoC tends to be moderate but may deplete over time due to stressors, as balancing these through personal resources alone is challenging (Nilsson et al., 2001). Notably, the SoC's dynamicity is also reflected that each phase required a focus on a particular domain, but this did not mean that other domains could be ignored (Andreassen & Wyller, 2005; Chumbler et al., 2008; Kwakkel et al., 2017; Van Puymbroeck et al., 2008). For reflectivity, SoC involves the ability to take different perspectives and understand connections within the context of stroke (Bachem & Maercker, 2018). This self-reflective process helps individuals manage the hardships associated with stroke by dialoguing their experiences (Andreassen & Wyller, 2005). This phenomenon is observed in informal caregivers (Forsberg-Warleby et al., 2002), dyads (Nilsson et al., 2001), and stroke family (Pierce, 2001). For independency only found in stroke dyads, one partner's SoC does not directly impact the other partner's SoC. This characteristic of independency suggests that dyads' SoC is influenced by factors beyond personal variables (Feigin, 1998).

Although research has demonstrated that the antecedent and consequent factors of SoC vary across different stages of stroke and among diverse populations, and while each study has emphasized specific aspects and outcomes, these studies collectively contribute to the development of a foundational framework for SoC in stroke. Despite a substantial body of literature exploring individual levels of SoC in stroke survivors and caregivers, there is a paucity of research on the interrelationships at the dyadic and family levels, primarily due to the lack of specific definitions and assessment mechanisms. Establishing a specific, unique, and comprehensive framework for SoC in stroke can transform its application into a systematic approach, thereby facilitating dynamic assessment, the development of care strategies, and effective implementation. This perspective on systematic care is crucial, as studies have indicated that higher family SoC is correlated with higher individual SoC (Cecen & Mert, 2023). Furthermore, the role of family SoC in mental health recovery can aid mental health professionals in providing therapeutic interventions to address underlying psychological distress, thereby enhancing patients' health-related quality of life (Hsiao et al., 2018). Evidence suggests that addressing both individual and group levels of psychological coherence offers a significant opportunity to deliver quality care for patients and their families (Pierce, 2001). However, achieving this approach necessitates collaboration and support from stroke survivors, family members, and healthcare providers.

Some research gaps were worth presenting based on the inconsistent results in antecedents of SoC in stroke. It is also interesting to note that some studies have shown that the functional and emotional state of stroke patients can also influence informal caregivers' SoC (Tooth et al., 2005), which is inconsistent with the included study. This may be because it is the SoC in stroke that may be better seen as a variable susceptible to intervention, as opposed to a static, unchangeable variable (Van Puymbroeck & Rittman, 2005). Besides, SoC can develop over the course of an individual's life and be adjusted by the present life situation (Lindström & Eriksson, 2005). Additionally, the current literature shows nonsignificant results on sociodemographic factors (age, gender, education level, and income status) and does not provide positive or negative evidence on how they affect the changes in SoC levels in stroke. The influence of demographic factors on SoC cannot be ignored and can indicate the intensity of resistance resources available in different social contexts (Barnard, 2013). It is recommended that future investigations explore the impact of antecedents on SoC in stroke.

## 5 | IMPLICATIONS FOR CLINICAL PRACTICE AND FUTURE RESEARCH

### 5.1 | Implications for clinical practice

The concept mapping of SoC in stroke has significant implications for healthcare providers in clinical practice. A holistic approach to SoC suggests that, in addition to stroke patients, the SoC of informal caregivers, dyads, and stroke families should also be considered when

assessing SoC in the context of stroke. Understanding and identifying the antecedents of SoC can help predict its levels in stroke patients and their caregivers, allowing practitioners to intervene early by addressing these antecedents to prevent a reduction in SoC. For instance, factors such as social support and access to healthcare services can be strengthened to enhance SoC. Moreover, evaluating the level of SoC provides insights into the psychological status, well-being, social and environmental conditions, and medical needs of patients, informal caregivers, dyads, and families. This evaluation helps practitioners foresee potential issues and tailor interventions accordingly. Consequently, using screening tools like the 13-item sense of coherence scale and the family sense of coherence scale becomes valuable for assessing SoC levels. Low scores on these scales indicate the need for additional support and targeted interventions to improve SoC.

Furthermore, the dynamic nature of SoC attributes across different stroke phases suggests that interventions should be tailored to the specific needs of each phase. For example, during the acute stroke phase, enhancing the comprehensibility aspect of SoC for patients by providing more education and knowledge about stroke is crucial. Subsequently, this focus can be adjusted in later phases to address manageability and meaningfulness as appropriate. Therefore, practitioners should adopt a holistic care approach that considers the SoC of not just the stroke survivors but also their caregivers and families. By doing so, they can ensure a supportive environment that fosters overall well-being and resilience.

In conclusion, incorporating SoC into clinical practice involves using screening tools to assess SoC levels, predicting and intervening based on antecedents, and tailoring interventions to the dynamic needs of patients, caregivers, and families across different stroke phases. This comprehensive approach may provide a possibility to enhance the quality of care and support provided to the stroke-affected population.

### 5.2 | Implications for future research

A preliminary conceptual definition of SoC in the field of stroke will facilitate its academic application in nursing discipline. Subsequently, the results of this study could also be applied to investigative studies in stroke using SoC as a point of reference. For example, there are currently no consistent results on the changes in SoC levels among stroke informal caregivers, dyads, and stroke families, suggesting that longitudinal studies in this area could be implemented to explore its dynamics in the future. Also, there are no consensus findings on whether antecedent factors, such as sociodemographic factors mentioned in *Discussions*, have a significant effect on SoC in stroke. The antecedents' framework in the concept mapping, which provides an initial reference, serves as a factor bank for future validation studies. The identification of statistically significant relationships in the results of the validation study may provide an opportunity to improve SoC levels in stroke through scientific intervention. In addition, nonstatistically significant antecedents as confounding factors for SoC in stroke should be considered as a priority in future investigations. Another point worth noting is that the reflectivity of SoC attributes could be used as a new domain for the revised SoC scale in the stroke area, which has yet to be validated. Interestingly, based on the current results for the measurement tools, the existing scales measuring SoC for stroke primarily included comprehensibility, manageability, and meaningfulness. This may provide an opportunity that reflectivity of attributes' characteristics could provide a possibility to add a new domain of SoC measurement tool in stroke.

## 6 | LIMITATION

There are several limitations that cannot be overlooked in this conceptual analysis. First, the search was restricted to English only, which limited the scope of the included studies. Second, the information provided by the cases was not sufficient and the conceptual elements of SoC in stroke dyads and families were not comprehensive enough due to the less relevant results of the original studies. It is recommended that more future studies on SoC in stroke dyads and families could be explored its differences and similarities in this field.

## 7 | CONCLUSION

This study clarifies the concepts, attributes, antecedents, consequences, and related terms of SoC in stroke. Several cases are also included to aid in the understanding of its application in stroke. This study provides a refreshing perspective on the SoC, which needs to be assessed comprehensively and scientifically from the perspective of stroke survivors, their informal caregivers, even stroke dyads, and the whole family. The findings can be used as a reference for future stroke-related studies, with SoC as point for investigation. It can also contribute to developing assessment tools and theoretical models mainly targeted to SoC in stroke.

### AUTHOR CONTRIBUTIONS

**Yaqian Liu:** Conceptualization; methodology; software; data curation; writing – original draft; visualization; formal analysis. **Angela Y. M. Leung:** Conceptualization; methodology; supervision; software; writing – review and editing. **Terence Lau:** Data curation; writing – review and editing; formal analysis. **Jed Montayre:** Conceptualization; writing – review and editing; formal analysis; supervision; visualization. **Wenru Wang:** Conceptualization; writing – review and editing. **Shanshan Wang:** Conceptualization; writing – review and editing. **Yaqi Huang:** Writing – review and editing; data curation.

### ACKNOWLEDGMENTS

Thanks to all the authors for providing guidance and feedbacks throughout this study.

### CONFLICT OF INTEREST STATEMENT

The author declares no conflicts of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## ORCID

*Yaqian Liu* https://orcid.org/0009-0002-0897-0725
*Angela Y. M. Leung* https://orcid.org/0000-0002-9836-1925
*Terence Lau* https://orcid.org/0000-0003-1951-1954
*Jed Montayre* https://orcid.org/0000-0002-2435-8061
*Wenru Wang* https://orcid.org/0000-0002-0265-8215
*Shanshan Wang* https://orcid.org/0000-0003-3881-0087
*Yaqi Huang* https://orcid.org/0000-0002-5068-2340

## REFERENCES

Andreassen, S., & Wyller, T. B. (2005). Patients' experiences with self-referral to in-patient rehabilitation: A qualitative interview study. *Disability and Rehabilitation*, *27*(21), 1307–1313.

Antonovsky, A., 1979. Health, stress, and coping. New perspectives on mental and physical well-being. 12–37.

Antonovsky, A., 1987. Health promoting factors at work: The sense of coherence. Psychosocial factors at work and their relation to health. 153–167.

Antonovsky, A., & Sourani, T. (1988). Family sense of coherence and family adaptation. *Journal of Marriage and the Family*, *50*, 79–92.

Bachem, R., & Maercker, A. (2018). Development and psychometric evaluation of a revised sense of coherence scale. *European Journal of Psychological Assessment*, *34*(3), 206–215.

Barnard, A. (2013). The role of socio-demographic variables and their interaction effect on sense of coherence. *SA Journal of Industrial Psychology*, *39*(1), 1–9.

Cecen, A. R., & Mert, M. A. (2023). Sense of coherence, family sense of coherence and psychological distress: The mediating role of self satisfaction. *International Journal of Mental Health and Addiction*, 1–15. https://doi.org/10.1007/s11469-023-01185-w

Chumbler, N. R., Rittman, M., Puymbroeck, M. V., Vogel, W. B., & Qnin, H. (2004). The sense of coherence, burden, and depressive symptoms in informal caregivers during the first month after stroke. *International Journal of Geriatric Psychiatry*, *19*(10), 944–953.

Chumbler, N. R., Rittman, M. R., & Wu, S. S. (2008). Associations in sense of coherence and depression in caregivers of stroke survivors across 2 years. *The Journal of Behavioral Health Services & Research*, *35*(2), 226–234.

Ekstam, L., Johansson, U., Guidetti, S., Eriksson, G., & Ytterberg, C. (2015). The combined perceptions of people with stroke and their carers regarding rehabilitation needs 1 year after stroke: A mixed methods study. *BMJ Open*, *5*(2), e006784.

Eriksson, M. (2022). The sense of coherence: The concept and its relationship to health. In *The Handbook of Salutogenesis* (pp. 61–68). Springer International Publishing.

Feigin, R. (1998). The relationship between the sense of coherence and adjustment to disability studied in the context of marital interrelations. *Marriage & Family Review*, *27*(1–2), 71–90.

Feigin, V. L., Stark, B. A., Johnson, C. O., Roth, G. A., Bisignano, C., Abady, G. G., Abbasifard, M., Abbasi-Kangevari, M., Abd-Allah, F., & Abedi, V. (2021). Global, regional, and national burden of stroke and its risk factors, 1990–2019: A systematic analysis for the global burden of disease study 2019. *The Lancet Neurology*, *20*(10), 795–820.

Forsberg-Warleby, G., Moller, A., & Blomstrand, C. (2002). Spouses of first-ever stroke victims: Sense of coherence in the first phase after stroke. *Journal of Rehabilitation Medicine*, *34*(3), 128–133.

Ghosh, C., & Adhikari, U. R. (2021). Incidence and risk factors of poststroke depression among acute stroke survival patients attending neurology outpatient department of a selected hospital in Kolkata. *Indian Journal of Psychiatric Nursing*, *18*(1), 17.

Guo, L.-N., Liu, Y.-J., McCallum, J., Söderhamn, U., Ding, X.-F., Yv, S.-Y., Zhu, Y.-R., & Guo, Y.-R. (2018). Perceived stress and depression amongst older stroke patients: Sense of coherence as a mediator? *Archives of Gerontology and Geriatrics*, *79*, 164–170.

Hjelle, E. G., Bragstad, L. K., Kirkevold, M., Zucknick, M., Bronken, B. A., Martinsen, R., Kvigne, K. J., Kitzmüller, G., Mangset, M., & Thommessen, B. (2019). Effect of a dialogue-based intervention on psychosocial well-being 6 months after stroke in Norway: A randomized controlled trial. *Journal of Rehabilitation Medicine*, *51*(8), 1056–1071.

Hsiao, C. Y., Lu, H. L., & Tsai, Y. F. (2018). Effect of family sense of coherence on internalized stigma and health-related quality of life among individuals with schizophrenia. *International Journal of Mental Health Nursing*, *27*(1), 138–146.

Jaracz, K., Grabowska-Fudala, B., Górna, K., Jaracz, J., Moczko, J., & Kozubski, W. (2015). Burden in caregivers of long-term stroke survivors: Prevalence and determinants at 6 months and 5 years after stroke. *Patient Education and Counseling*, *98*(8), 1011–1016.

Jaracz, K., Grabowska-Fudala, B., Górna, K., & Kozubski, W. (2014). Caregiving burden and its determinants in polish caregivers of stroke survivors. *Archives of Medical Science*, *10*(5), 941–950.

Jaracz, K., Grabowska-Fudala, B., & Kozubski, W. (2012). Caregiver burden after stroke: Towards a structural model. *Neurologia i Neurochirurgia Polska*, *46*(3), 224–232.

Kitzmüller, G., Asplund, K., & Häggström, T. (2012). The long-term experience of family life after stroke. *Journal of Neuroscience Nursing*, *44*(1), E1–E13.

Kwakkel, G., Lannin, N. A., Borschmann, K., English, C., Ali, M., Churilov, L., Saposnik, G., Winstein, C., Van Wegen, E. E., & Wolf, S. L. (2017). Standardized measurement of sensorimotor recovery in stroke trials: Consensus-based core recommendations from the stroke recovery and rehabilitation roundtable. *Neurorehabilitation and Neural Repair*, *31*(9), 784–792.

Langius, A., Björvell, H., & Antonovsky, A. (1992). The sense of coherence concept and its relation to personality traits in Swedish samples. *Scandinavian Journal of Caring Sciences*, *6*, 165–171.

Larson, J., Franzén-Dahlin, Å., Billing, E., von Arbin, M., Murray, V., & Wredling, R. (2005). Predictors of quality of life among spouses of stroke patients during the first year after the stroke event. *Scandinavian Journal of Caring Sciences*, *19*(4), 439–445.

Leung, A. Y. M., Parial, L. L., Tolabing, Ma, C., Sim, T., Mo, P., Okan, O., & Dadaczynski, K. (2022). Sense of coherence mediates the relationship between digital health literacy and anxiety about the future in aging population during the COVID-19 pandemic: A path analysis. *Aging & Mental Health*, *26*(3), 544–553. https://doi.org/10.1080/13607863.2020.1870206

Lindström, B., & Eriksson, M. (2005). Salutogenesis. *Journal of Epidemiology & Community Health*, *59*(6), 440–442.

Lou, S., Carstensen, K., Jørgensen, C. R., & Nielsen, C. P. (2017). Stroke patients' and informal carers' experiences with life after stroke: An overview of qualitative systematic reviews. *Disability and Rehabilitation*, *39*(3), 301–313.

Medeiros, G. C., Roy, D., Kontos, N., & Beach, S. R. (2020). Post-stroke depression: A 2020 updated review. *General Hospital Psychiatry*, *66*, 70–80.

Mountain, A., Patrice Lindsay, M., Teasell, R., Salbach, N. M., de Jong, A., Foley, N., … Cameron, J. I. (2020). Canadian stroke best practice recommendations: Rehabilitation, recovery, and community participation following stroke. Part two: Transitions and community participation following stroke. *International Journal of Stroke*, *15*(7), 789–806.

Nilsson, I., Axelsson, K., Gustafson, Y., Lundman, B., & Norberg, A. (2001). Well-being, sense of coherence, and burnout in stroke victims and

spouses during the first few months after stroke. *Scandinavian Journal of Caring Sciences*, *15*(3), 203–214.

Oliva-Moreno, J., Peña-Longobardo, L. M., Mar, J., Masjuan, J., Soulard, S., Gonzalez-Rojas, N., Becerra, V., Casado, M. Á., Torres, C., & Yebenes, M. (2018). Determinants of informal care, burden, and risk of burnout in caregivers of stroke survivors: The CONOCES study. *Stroke*, *49*(1), 140–146.

Paige, S. R., Stellefson, M., Krieger, J. L., Anderson-Lewis, C., Cheong, J., & Stopka, C. (2018). Proposing a transactional model of eHealth literacy: Concept analysis. *Journal of Medical Internet Research*, *20*(10), e10175. https://doi.org/10.2196/10175

Perrin, P. B., Heesacker, M., Hinojosa, M. S., Uthe, C. E., & Rittman, M. R. (2009). Identifying at-risk, ethnically diverse stroke caregivers for counseling: A longitudinal study of mental health. *Rehabilitation Psychology*, *54*(2), 138–149.

Perrin, P. B., Heesacker, M., Stidham, B. S., Rittman, M. R., & Gonzalez-Rothi, L. J. (2008). Structural equation modeling of the relationship between caregiver psychosocial variables and functioning of individuals with stroke. *Rehabilitation Psychology*, *53*(1), 54–62.

Pierce, L. L. (2001). Coherence in the urban family caregiver role with African American stroke survivors. *Topics in Stroke Rehabilitation*, *8*(3), 64–72.

Pugh, J. D., McCoy, K., Williams, A. M., Pienaar, C. A., Bentley, B., & Monterosso, L. (2022). Neurological patient and informal caregiver quality of life, and caregiver burden: A cross-sectional study of post-discharge community neurological nursing recipients. *Contemporary Nurse*, *58*(2–3), 138–152.

Rena, F., Moshe, S., & Abraham, O. (1996). Couples' adjustment to one partner's disability: The relationship between sense of coherence and adjustment. *Social Science & Medicine*, *43*(2), 163–171.

Ribeiro de Souza, F., Sales, M., Rabelo Laporte, L., Melo, A., & Manoel da Silva Ribeiro, N. (2022). Body structure/function impairments and activity limitations of post-stroke that predict social participation: A systematic review. *Topics in Stroke Rehabilitation*, *30*, 1–14.

Rodgers, B. L., Jacelon, C. S., & Knafl, K. A. (2018). Concept analysis and the advance of nursing knowledge: State of the science. *Journal of Nursing Scholarship*, *50*(4), 451–459.

Rodgers, B. L., & Knafl, K. A. (1993). Concept development in nursing: Foundations, techniques, and applications.

Sacco, R. L., Kasner, S. E., Broderick, J. P., Caplan, L. R., Connors, J., Culebras, A., Elkind, M. S., George, M. G., Hamdan, A. D., & Higashida, R. T. (2013). An updated definition of stroke for the 21st century: A statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*, *44*(7), 2064–2089.

Sagy, S. (1998). Effects of personal, family, and community characteristics on emotional reactions in a stress situation: The Golan Heights negotiations. *Youth & Society*, *29*, 311–329.

Schünemann, H., Brożek, J., Guyatt, G., & Oxman, A. (2013). Handbook for grading the quality of evidence and the strength of recommendations using the GRADE approach.

Surtees, P. G., Wainwright, N. W., Luben, R. L., Wareham, N. J., Bingham, S. A., & Khaw, K.-T. (2007). Adaptation to social adversity is associated with stroke incidence: Evidence from the EPIC-Norfolk prospective cohort study. *Stroke*, *38*(5), 1447–1453.

Tistad, M., Tham, K., von Koch, L., & Ytterberg, C. (2012). Unfulfilled rehabilitation needs and dissatisfaction with care 12 months after a stroke: An explorative observational study. *BMC Neurology*, *12*(1), 1–7.

Tofthagen, R., & Fagerstrøm, L. M. (2010). Rodgers' evolutionary concept analysis–a valid method for developing knowledge in nursing science. *Scandinavian Journal of Caring Sciences*, *24*, 21–31.

Tooth, L., McKenna, K., Barnett, A., Prescott, C., & Murphy, S. (2005). Caregiver burden, time spent caring and health status in the first 12 months following stroke. *Brain Injury*, *19*(12), 963–974.

Van Puymbroeck, M., Altenburger, P., Combs-Miller, S. A., Miller, K. K., Kean, J., & Schmid, A. (2014). The influence of mood-related variables on activity and participation in individuals with chronic stroke. *Topics in Geriatric Rehabilitation*, *30*(3), 216–222.

Van Puymbroeck, M., & Rittman, M. R. (2005). Quality-of-life predictors for caregivers at 1 and 6 months poststroke: Results of path analyses. *Journal of Rehabilitation Research & Development*, *42*(6), 747–760.

Van Puymbroeck, M., Sberna Hinojosa, M., & Rittman, M. R. (2008). Influence of sense of coherence on caregiver burden and depressive symptoms at 12 months poststroke. *Topics in Stroke Rehabilitation*, *15*(3), 272–282.

Walker, L. O., & Avant, K. C. (2005). *Strategies for theory construction in nursing*. Pearson/Prentice Hall.

Wu, M. H., Lee, S., Su, H. Y., & Pai, H. C. (2015). The effect of cognitive appraisal in middle-aged women stroke survivors and the psychological health of their caregivers: A follow-up study. *Journal of Clinical Nursing*, *24*(21–22), 3155–3164.

Ytterberg, C., Kristensen, H. K., Tistad, M., & von Koch, L. (2020). Factors related to met needs for rehabilitation 6 years after stroke. *PLoS One*, *15*(1), e0227867.

Zhu, W., & Jiang, Y. (2018). A meta-analytic study of predictors for informal caregiver burden in patients with stroke. *Journal of Stroke and Cerebrovascular Diseases*, *27*(12), 3636–3646.

## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

**How to cite this article:** Liu, Y., Leung, A. Y. M., Lau, T., Montayre, J., Wang, W., Wang, S., & Huang, Y. (2024). Sense of coherence in stroke: A concept analysis with Rodger's evolutionary approach. *Nursing & Health Sciences*, *26*(3), e13151. https://doi.org/10.1111/nhs.13151