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Review Article

Exploring the Landscape of Eco-Mapping in Health Services Research: A Comprehensive Review

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Health services research is important in improving health systems' and providers' efficiency and effectiveness. This may require health services to intervene at an individual and community level to address people's complex social issues. An important issue is social connections, which have been identified as a social determinant of health and can help buffer stressful life events. Social support networks can be visualized using eco-maps, a tool that originated in child welfare practices and has been adopted widely by clinicians and researchers. This paper aims to understand where and how eco-maps have been used in health services research. To answer the research questions, this scoping review used the Joanna Briggs Institute guidelines for scoping reviews. In total, 70 studies were included in the scoping review. The authors found that social support denoted in an eco-map does not guarantee the provision of support; however, the dialogue needed to create an eco-map could facilitate conversations about care expectations, identification of vulnerable points or risk factors, and actions to improve family and individual functioning. A significant gap remains in the knowledge and use of eco-maps in identifying population service and resource gaps and how to bridge the knowledge-to-action chasm better. Further exploration is needed to examine how to optimize the application of eco-mapping in the health services context, including generating guidelines, templates, or instructions for implementation. Therefore, addressing this gap is vital for ensuring eco-mapping informs future service design and policy changes.

1. Introduction

Health services research is relied on to improve the efficiency and effectiveness of health professionals and healthcare systems [1, 2]. To further the health and well-being of populations [3], effective health systems and healthcare delivery must operate within the social context of individuals and communities [4]. This may mean recognizing and intervening at the individual and community level to address social challenges [5]. The ecological systems theory captures this complex interplay between individual, community, and societal factors and supports application to systems-thinking more broadly [6].

Only recently has the status of one's social connections been recognized as a social determinant of health [7, 8]. As an umbrella term, *social connection* represents how we can

connect to others socially through physical, behavioural, social-cognitive, and emotional means [9]. Positive interpersonal relationships can buffer stressful life events by mitigating their negative impacts [10, 11]. Notably, support from family and friends and meaningful engagement in social activities and relationships can improve longevity and physical and cognitive capabilities [10]. Assessing social connections and networks to determine population risk [9] or intervening to strengthen those relationships can significantly reduce psychological distress [12]. There is also a strong push for adopting a "whole-of-systems" response to connecting and reconnecting people to address widespread social isolation [13].

Social support networks, when visualized, can provide rich information about the interplay between the relationships of individuals and families with other systems [14]. One tool used to diagram relationships is the *eco-map*. Eco-maps originated in the 1970s as an assessment tool to help workers in public child welfare practice examine the needs of children and families [15]. They are graphic illustrations of individuals or family units shown in the center of a circle. Outer circles within concentric circles formed around the center represent the sources of connection to that person or family, reflecting less intimate relationships moving outward [16]. Lines joining the outer circles to the central circle are denoted in specific ways to represent the nature of the relationships. For example, a solid or thick line represents a critical or strong connection, a dotted line means a tenuous connection, and a jagged line could signify a conflicted connection [15]. Lines with arrows indicate the direction of resources, energy, or interests [15]. See Figure 1 for a sample eco-map drawing. With the diagram's representation of familial and environmental relationships, it is possible to evaluate the range of, or lack of, support and assistance available to people and families [17] and communities [18].

In recent years, practitioners, researchers, and decision makers have utilized eco-maps in various ways in health services research [15, 19, 20]. Notably, researchers with clinical expertise have used eco-maps to generate research data within a study context [16]. Therefore, as an assessment, planning, and intervention tool, eco-mapping spans, but is not limited to, end-of-life care [21, 22], discharge and community reintegration planning [20, 23], and community asset mapping [18]. Given the increasing attention on social connections as a public health priority [9], eco-maps could be leveraged through research to capture gaps and opportunities in health services and supportive care networks [17]. Mounting evidence of eco-mapping used to analyze support networks demonstrates its practicality [24, 25]; however, a synthesis of what is known about eco-mapping in the extant health services literature is yet to be done. A scoping review is warranted to understand for what purpose and how eco-mapping has been used broadly in health services research.

1.1. Objective.
This paper aims to understand where and how eco-maps have been used in health services research by addressing the following research questions:

(1) What are the characteristics (i.e., study design and methods, setting and sample population, and research aims) of eco-mapping studies in health services research?

(2) What methodological considerations have been reported in the literature (i.e., use and construction of eco-maps, analysis, and challenges) for using eco-maps in health services research?

(3) What are the implications of eco-mapping on health services?

2. Methods

This scoping review was completed following the Joanna Briggs Institute (JBI) methodology for best practices and scoping reviews [26, 27]. Our approach aligns with JBI's five stages: identifying the research question, identifying relevant studies, study selection, charting the data, and collating, summarizing, and reporting the results. This review was registered on 13 December 2022 with the Open Science Framework (OSF) registry (registry DOI: https://doi.org/10.17605/OSF.IO/GAWYN), and the study protocol was previously published [28]. This study did not require a research ethical board approval as it did not involve human or animal subjects. Findings are presented according to the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews" (PRISMA-ScR) Checklist [29].

2.1. Stage 1: Identifying the Research Question.
It is well-recognized that placing people and communities at the center of their health and care is vital to how services are designed and delivered [30]. However, it is unclear how eco-mapping, an approach for visualizing social networks, could support well-planned, integrated health services. In the current study, we are conducting a scoping review to report the findings and a range of research concerning eco-mapping in health service research and potential opportunities for future research. To support our goal and knowledge gap, the study authors identified the following research questions:

(1) What are the characteristics (i.e., study design and methods, setting and sample population, and research aims) of eco-mapping studies in health services research?

(2) What methodological considerations have been reported in the literature (i.e., use and construction of eco-maps, analysis, and challenges) for using eco-maps in health services research?

(3) What are the implications of eco-mapping on health services?

2.2. Stage 2: Identifying Relevant Studies.
An information specialist (AOC) developed the search strategy with the first author (MS) by initially searching Ovid MEDLINE on 2 December 2022 to identify relevant articles. The text words
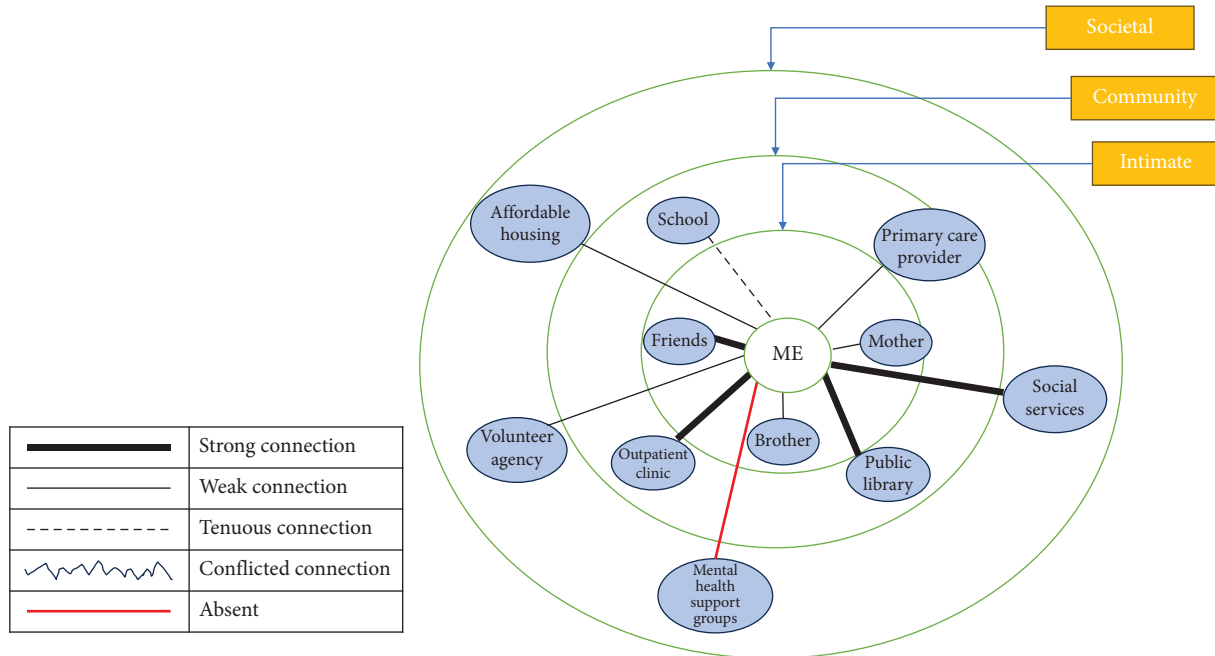
FIGURE 1: Eco-map example.

in the titles and abstracts of relevant articles and the index terms used to describe the studies were used to develop a complete search strategy for Ovid MEDLINE. The full and final syntax of search terms is provided in Supplemental File 1. The search strategy was then adapted for each database searched, including Ovid MEDLINE, Ovid Embase, CINAHL Ultimate (EBSCOhost), Emcare (Ovid), Cochrane Central Register of Controlled Trials (Ovid), and Cochrane Database of Systematic Reviews (Ovid) Study/Source of Evidence selection. The search strategy was also limited to studies published in English and a retrieval period from the date of database construction to 16 January 2023.

2.3. Stage 3: Study Selection. The results across all the databases were combined and imported to Covidence software to assist with screening and data extraction activities and removing duplicated publications [31]. Before screening, two reviewers (MS and HS) conducted a pilot test on 10 titles and abstracts of the screening criteria to assess reviewer agreement. Discrepancies in the agreement were resolved through consensus between the reviewers, and we performed another pilot test of 10 articles that resulted in no conflicts between the reviewers. Following the pilot testing, all titles and abstracts were screened by the reviewers against the following inclusion criteria: (1) published in the English language in a peer-reviewed journal; (2) reports the application of eco-mapping/eco-map(s) in a health services research context (defined below); and (3) and includes primary data (see Table 1). In the second stage, the full text of potentially eligible articles from stage one was reviewed by both authors. The study selection process is summarized in the PRISMA flowchart in Figure 2. This scoping review included studies of all design types; however, non-peer-reviewed, case examples, dissertations, or commentaries were excluded. Following the JBI construct of Population, Concept, and Context (PCC), the inclusion criteria are the following.

2.4. Population. As the review focused on using eco-mapping more broadly in health services research, we included studies focused on any clinical population or study participants to ensure a broad scope of the literature.

2.5. Concept. The core concept involved applying eco-mapping/eco-map(s) in research studies. Eco-maps were defined as visual illustrations with the individual or family unit placed at the center, surrounded by relationships they identified as part of their social environments [15, 32].

2.6. Context. Since a globally accepted definition of health services research does not exist, the Canadian Institute of Health Research (CIHR) definition was chosen given its application to other scoping reviews and familiarity with the study authors [33, 34]. CIHR is Canada's federal funding agency for health research. The agency defines *health services research* as research to improve the efficiency and effectiveness of health professionals and the healthcare system through changes to practices and policy. Health services research consists of a multidisciplinary approach to the scientific inquiry of how social factors, financing systems, organizational structures and processes, health technologies, and personal behaviours affect access to health care, the quality and cost of such care, and ultimately the public's well-being [2]. We excluded studies outside the scope of health services research, such as environmental [35] and educational [36, 37] research.

TABLE 1: Inclusion and exclusion criteria.

|	Inclusion criteria	Exclusion criteria
Population	(i) Any clinical population or study participants	(i) None
Concept	(i) Application of applying eco-mapping/eco-map(s) in research studies defined as visual illustrations with the individual or family unit placed at the center, surrounded by relationships they identified as part of their social environment	(i) Application of a similarly termed tool, such as "ecograms"
Context	(i) Applied in health services research defined as research to improve the efficiency and effectiveness of health professionals and the healthcare system through changes to practices and policy	(i) Non-health services research context, such as education or environmental research
Characteristics	(i) Published in English (ii) Contains primary data (iii) Any study design	(i) Non-peer-reviewed (ii) Paper type (i.e., dissertation, commentary, and conference abstract)
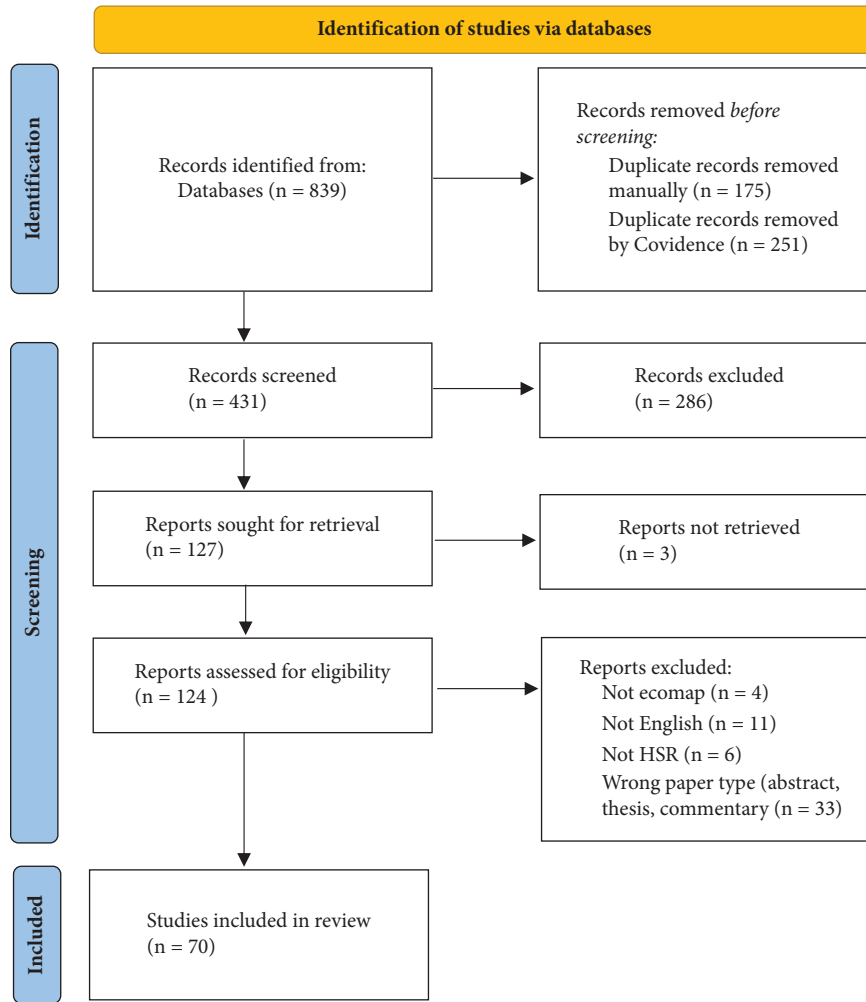
FIGURE 2: PRISMA flow diagram [40].

2.7. Stage 4: Charting the Data. The extraction form was piloted by two authors (MS and HS) and expanded to include additional details. Several reviewers (MS, HS, SB, KS, LW, and BA) then independently extracted data from the included studies using Covidence software [31]. Relevant categories for the data form consisted of author, year of publication, country of origin, study purpose/aim, study design, data collection method(s), study participants, sample size and setting, analysis, application of eco-mapping, rationale for use and stated benefits and challenges, study findings, and implications for health services. The first author (MS) verified the extracted data for accuracy and completeness.

2.8. Stage 5: Collating, Summarizing, and Reporting the Results. Once collated into an Excel spreadsheet for analysis, the data were summarized using a basic numerical account to summarize the studies, followed by JBI's scoping review guidance recommendation of basic qualitative content analysis [26]. One researcher (MS) used a combination of directed content analysis (deductive analysis) [38], drawing on the review objectives and the concepts of Population (i.e.,

clinical population), Concept (i.e., visual illustration, social environment, and family unit), and Context (i.e., hospital, mental health, and primary care) defined a priori to identify preconceived codes and inductive conventional content analysis [38]. For the latter, the researcher (MS) read the extracted data and coded additional codes (i.e., support network, care network, family function, etc.). Codes with similar concepts were grouped to form categories, contributing to the formation of methodological considerations. The directed content analysis leverages existing research to derive and apply categories, while inductive captures emergent categories [39].

3. Results

The screening process following the PRISMA 2020 framework [40] for reporting scoping reviews is illustrated in Figure 2. The initial search yielded 839 results. After removing 426 duplicate entries, 413 unique records underwent title/abstract screening. At this point, 286 entries were excluded, leaving 124 records for a full-text review. Fifty-four studies were excluded at this stage, resulting in a total of 70 studies included in the final dataset meeting inclusion

criteria. Reasons for exclusion varied, with most ($n = 33$) studies lacking empirical data, non-English presentation ($n = 11$), falling outside health services research scope ($n = 6$), and studies that mention eco-mapping yet failed to report any details of how in the study the tool was used ($n = 4$). The majority of studies came from work conducted in Brazil ($n = 33$), followed by Canada ($n = 10$), the United States ($n = 9$), Australia ($n = 6$), New Zealand ($n = 3$), and Sweden ($n = 2$). The remaining singular studies came from Denmark, Hong Kong, Africa (i.e., Malawi), Mexico, Singapore, Japan, and the UK. See Supplemental File 2 for study characteristics.

The studies were published from 2000 to 2022, with half ($n = 26$) in the past six years (2016–2022). The health discipline most reported in conducting the research by identifying the researcher(s) affiliation was nursing in forty-three studies with less representation by social work ($n = 6$). The remaining studies were either situated in the occupational therapy field ($n = 1$) or included several disciplines and thus were considered interdisciplinary ($n = 4$). Finally, 23% ($n = 16$) of the studies did not report the discipline or discipline reporting needed more clarity.

3.1. Study Characteristics.

For research question one, we examined the characteristics of the included studies in more detail below, covering the reported study design and data collection methods, study setting and the sample, phenomena of interest, and implications for health services.

3.1.1. Study Design and Methods.

Most studies reported a qualitative study design ($n = 58$) [17, 18, 21, 41–60] and [61–94], followed by mixed methods ($n = 9$) [95–103] and quantitative designs ($n = 3$) [22, 104, 105]. Data collection methods consisted of semistructured interviews alone ($n = 36$) [17, 41–44, 46, 48, 52, 53, 56, 58, 59, 61–65, 67, 69, 70, 72, 76, 78–81, 83–85, 88, 89, 92, 93, 104] or interviews combined with focus groups [77, 98], surveys [22, 95, 96, 99–103], participant observations [49, 51, 54, 55, 57, 60, 66, 68, 71, 73, 97], document analysis (i.e., field notes and medical records) [50, 54, 66, 74, 86, 96, 101], and photographs (i.e., photovoice) [86, 90]. Several studies used only focus groups [18, 91], analysis of institutional medical records [47], questionnaires [105], and participant observation methods [94]. The data collection method applied in three studies was not reported [45, 82, 87].

3.1.2. Study Setting.

The majority ($n = 31$) of the studies reported collecting data in the community (i.e., homes of the participants, private offices, or workplaces) [41–45, 49, 51, 54, 56, 57, 61, 67, 70–73, 75, 76, 78, 82, 84, 86, 90, 92–95, 97, 102, 103, 105], or an outpatient clinic ($n = 6$) [46, 48, 64, 65, 98] or inpatient unit ($n = 5$) [47, 52, 62, 91, 100] was cited. Less often reported was a community health center ($n = 2$) [60, 104], residential care ($n = 2$) [18, 55], hospice ($n = 1$) [22], school ($n = 1$) [101], and a virtual platform ($n = 1$) [88]. Eight studies reported collecting data in a combination of settings [50, 58, 66, 68, 74, 79, 83, 96]. The reporting of the study setting was unclear in the remaining 13 studies [17, 21, 53, 59, 63, 69, 77, 80, 81, 85, 87, 99].

3.1.3. Population/Sample and Size.

The target populations of the study participants were highly variable, including those with chronic conditions, like cancer [64, 72, 73, 92, 93, 100], type 2 diabetes and hypertension [46, 58, 59], dementia [57], mental health disorders [52, 55, 90], and those receiving stomatherapy services [45]. Studies also considered individuals who were terminally ill [22], pregnant women [84, 104], community-dwelling adults (i.e., seniors, farmers, and persons of Indigenous descent) [18, 21, 41–43, 53, 102], and adolescents [48, 80, 96, 103] as participants. Another target group was family units [44, 47, 49–51, 54, 56, 60, 70, 74, 78, 79, 82, 83, 85, 87, 101, 105], caregivers (i.e., parents, spouses, and single mothers) [17, 61–63, 65–69, 71, 75, 76, 80, 81, 86, 95, 97–99], and siblings of children with complex care needs [88, 89]. Finally, five studies included healthcare professionals (i.e., nurses) [58, 66, 77, 91, 101] and nursing students as the population under study [94]. The sample sizes ranged from one to over 40 participants. We categorized the ranges by 10 : 1 to 9 ($n = 14$) [43, 45, 55, 71, 73, 77, 82, 86, 87, 92, 96, 98, 99, 101], 10 to 19 ($n = 10$) [50, 65, 69, 74, 79, 84, 89, 91, 93, 97], 20 to 29 ($n = 14$) [42, 46, 57, 60, 63, 64, 67, 72, 75, 76, 83, 88, 95, 103], 30–39 ($n = 7$) [48, 53, 56, 59, 61, 68], and a sample with 40 or more participants ($n = 9$) [21, 22, 44, 66, 81, 90, 100, 102, 105]. Some sample sizes were drawn from the number of families involved, which is categorized in ranges from 1 to 4 families ($n = 10$) [41, 47, 49–52, 78, 82, 85, 87], 5 to 9 ($n = 3$) [54, 58, 61], 10 to 14 ($n = 3$) [60, 70, 74], and more than 15 family units ($n = 2$) [17, 56].

3.1.4. Research Aims.

The authors also synthesized the research aims as reported in the studies. We considered these research objectives broadly as what the authors wanted their research to understand, predict, explain, or describe. Therefore, we identified several overarching research aims across the studies. First, 24 studies reported an objective of mapping individuals' social, helping or care networks, psychosocial profiles, support systems and needs, and social capital [21, 22, 42, 44, 45, 48–50, 52, 55, 57, 64, 65, 68, 73, 78, 84, 93, 95–97, 100, 103], and one paper considered longitudinally the constitution of support networks [66]. Fifteen studies aimed to understand the family structure, function, or organization [56, 102], while some were in response to family violence [41, 47], addressing chronic and acute mental and physical health conditions [46, 51, 58–60, 70, 74, 79, 101, 105], and natural disasters [54]. Ten studies described participants' use of services and resources, including types of formal social support accessed [63, 69, 72, 81–83, 85, 86, 88, 106]. Thirteen studies also focused on particular lived experiences, like rural families' use of medicine plants [43], perceived intraracial exclusion [53], men with prostate cancer [92], the daily lives of pregnant women [104], caregiver experiences [61, 71, 75, 76, 99], lesbian mothers [67], and young people [80, 89, 90]. Last, seven studies described clinicians' and researchers' application of the eco-map tool in various settings [17, 62, 77, 87, 91, 94, 98].

3.2. Methodological Considerations. In the following section, we summarize what methodological considerations have been reported in the literature (i.e., use and construction of eco-maps, analysis, and challenges) for using eco-maps in health services research. In doing so, we identified several broad ways the eco-maps were applied in the included studies. Researchers' application of eco-maps was credited with optimizing data visualization for the participants and the researcher and as a data organizational tool. For some authors, eco-maps also enhanced clinical assessments and interventions and seemed to optimize communication between researcher and participant.

3.2.1. Uses for Eco-Maps

(1) Data Visualization Tool. Using the eco-mapping tool enabled researchers to develop a "visible" [21] and a comprehensive overview of resources, the social support network, and the strength of these relationships for individuals and families [17, 22, 44, 45, 48, 50–54, 56, 58, 59, 61–63, 65, 67–69, 71–74, 77, 79, 81, 84, 87, 89, 92, 96, 99, 102, 103] that could not have been achieved solely using interviews or surveys alone [49, 57, 59, 95, 101] (see Figure 3). The ability to describe the varying dimensions of relationships in detail gave researchers a rich understanding of how participants positioned themselves in relational landscapes [80]. For practitioners, eco-mapping was valued for its ability to visualize support networks from the perspectives of families and individuals [87, 93].

(2) Data Organization and Comprehensiveness Tool. Eco-maps were used successfully to support data collection in the context of social networks and relationships for a range of populations [17, 63, 68, 87]. We observed how eco-maps supported deep exploration and organization findings during the interview process [21, 51, 53, 54, 57, 67, 68, 80, 92, 93, 97] and triangulate multiple data sources to reinforce data comprehensiveness (i.e., photos, text, and observations) [17, 63, 90]. In line with data visualization, some authors also referred to eco-maps ability to "synthesize" the data for greater visual impact [44]. Mercier and Harold [67] noted how eco-maps collect and organize data from an eco-systemic perspective. In this study, eco-maps were used to capture the sociocultural context of participants' lives and structure the interview process [67]. At a community level, Seah et al. [18] used eco-mapping to organize community aging assets, enabling older adults to understand access to their local aging assets.

(3) Clinical Tool. Eco-mapping was an effective strategy used by healthcare professionals for the assessment and intervention of individuals and families. Specifically, authors of thirteen studies reported using the "Calgary Family Assessment Model" (CFAM) to understand better the structural constitution and relational functioning of individuals and families [41, 46, 47, 52, 56, 60, 62, 68, 69, 77, 82, 91, 101]. The CFAM is organized into the genogram and the eco-map tools, and there is a heavy emphasis on identifying strengths and weaknesses with the expectation of proposing interventional measures for families. Many authors suggested that through eco-mapping and understanding the family dynamics, bonds, and available sources of support [21, 45, 48, 75, 78, 83, 85, 88, 95, 99, 100, 102], healthcare professionals can tailor their communication approaches and information [21, 22]. With consistent updates, the tool was recognized as a helpful reminder of the available social resources for patients and family members [59, 76, 98, 105]. Several authors suggested that eco-maps offer a systematic way of assessing and organizing resources that could be reviewed with patients and families periodically [59, 61]. Nurses and allied healthcare providers were often suggested to be well-positioned to assess family situations using eco-maps to establish appropriate interventions to support care [47, 75, 76, 91, 94]. Other authors used eco-mapping to "measure social support" of family members and individuals in the wider context in which they exist [63, 99].

(4) Engagement and Reflective Tool. A few authors noted that co-constructing meaning and negotiating the creation of the eco-map between individuals and family members provided useful research data [17, 57, 58] and contributed to the meaningful involvement of people and a trusting relationship between participants and researcher [17, 57, 79]. Relationally, eco-maps strengthened the rapport between individuals and families and those facilitating the map [56, 71], thus accelerating the ability to intervene clinically if necessary [101] or to reflect the participants' world view through the eco-map [17]. Authors of one study stated that eco-maps illuminated and "verified a shared perception" of the participants' family functioning [46], thus reinforcing the researcher-participant connection. Two studies highlighted the value of reflection encouraged by eco-maps [105] over the imposition of research preconceptions on the data collection process [57].

3.2.2. Constructing Eco-Maps. Some of the authors offered details as to how the eco-maps were made. Many described that the eco-map involved a circle in the middle with the individual's name or a dyad (patient and carer) [97], surrounded by outer circles representing the support or "subjects" (e.g., family, friends, community, health, and work) in their everyday lives [21, 55, 86, 89, 90, 92, 95, 96, 99, 103]. These studies included the meaning of the lines and arrow directions connected to the center circle, indicating the nature of the interactions (e.g., positive, tenuous, conflicted, etc.) [17, 48, 53, 74, 78, 82, 85, 95], and two studies designated symbols and colours to represent the types of support received [80, 103]. Authors of six studies mentioned that "computer software" (e.g., Edraw Mindmap, Dia, GenoPro, and Corel-DRAW) was used in the eco-map construction [41, 51, 52, 65, 84, 91]. Several studies detailed modifications made to the eco-map. For example, three studies reported a modification consisting of a simple genogram (i.e., family tree) surrounded by the eco-map [17, 53, 67, 70]. Some authors created a template that included labelled and unlabelled outer circles [53, 67].
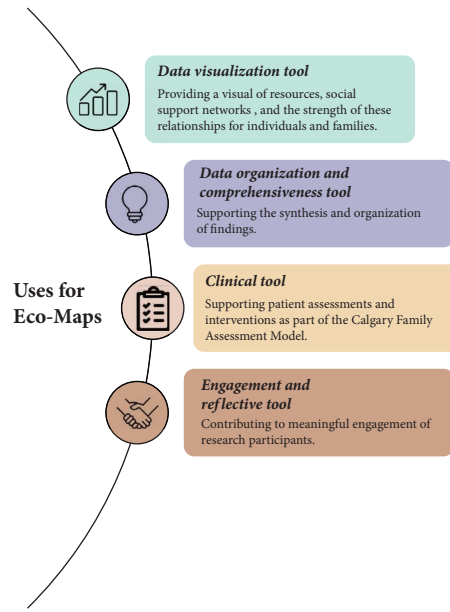
Figure 3: Uses for eco-maps.

Similarly, a minimalist eco-map consisting of the inner circle and six blank outer circles was meant to facilitate the inclusion of persons with dementia [57]. The "Circles of Care Eco-map" ensured that the patient's chosen caregiver occupied an inner circle, and the map highlighted both formal and informal services [22]. Last, authors of one paper provided extensive instructions on how they created a digital prototype of an eco-map [98].

3.2.3. Analytical Approaches.

The analytical approach reported by many study authors consisted of mostly qualitative methods and some quantitative statistical analyses. Often, the analysis was conducted by reviewing the text data and related eco-maps to gain a sense of the data. In this way, the eco-maps were analyzed with the interviews to gain deeper insights into the meaning of the narrative [64, 80, 103]. For example, authors Joubert et al. [64] described a coding process presenting salient themes at each eco-map level. The most commonly reported analytical techniques were thematic analysis [18, 46, 53, 57, 59, 78, 81, 86], content analysis [49, 50, 63, 65, 92, 93, 100–103], thematic content analysis [56, 60, 68, 70, 79, 84], and an inductive or a "general inductive analysis approach" [58, 77, 91]. Several studies reported applying a theoretical framework (i.e., systems theory and thematic network analysis model) to the analysis process to identify sources of support deductively [52, 64, 72, 76, 90, 95]. Some studies referred to discourse analysis [48, 69, 83], corpus reading [51], narrative analysis [54], interpretive analysis [71], the Method of Interpretation of the Senses [74], an approach based on "assumptions of qualitative field research" [104], reflexive thematic analysis [63], framework analysis [96], and a combination of deductive and inductive approaches to analysis [67].

3.2.4. Identified Challenges.

While primarily the benefits of eco-maps were reported, several authors mentioned challenges. For example, challenges included time constraints in completing the tool [104], pressure to maintain workflow, and potential difficulties in addressing issues raised by participants [98]; however, some studies reported the time required to complete the tool (i.e., in about two minutes) [62]. Several authors suggested eco-maps' downfalls as the lack of exhaustive findings [18] and researchers sensing discomfort in the participants and interviewers with the tool [21].

3.3. Implications for Health Services.

Findings from the studies indicated several implications for health services related to assessment and patient and family engagement. A prominent suggestion was ensuring individuals and families access the necessary supportive relationships to improve their quality of life and well-being. This could be done through facilitative conversations about care expectations of social support networks [42, 52, 73]. Similarly, some authors advocated for families' active involvement in assessments and treatment planning, like eco-maps, to improve patients' self-management behaviours, meet complex care needs, and assist with discharge planning [22, 46, 49, 58, 62, 71, 82, 88, 89].

It was also recognized that eco-maps could capture information to inform clinical care. For instance, many authors identified the role of healthcare professionals (e.g., nursing) in supporting individuals and families by getting to know the family dynamics and sociocultural environments of individuals [47, 49–51, 62, 65, 67, 69, 72, 75, 77, 84, 87, 91, 99, 100, 104], transferring knowledge on various topics (i.e., medicinal plants and health and genetic

information) [43, 83, 100], identifying vulnerable points and risk factors (e.g., need for respite care) [18, 45, 47, 52, 60, 66, 74, 94], and establishing, promoting, or evaluating accessible support and care strategies [44, 45, 59, 65, 70, 74, 81, 103]. One study author referred to this approach as including "individual social capital" (i.e., cultural, economic, interpersonal, and social context) as part of the team approach to promoting cancer survivorship [64].

According to six studies, applying eco-maps to emphasize family strengths and resources can increase opportunities for healthcare providers to achieve positive outcomes [58, 79, 101, 105], promoting closer bonds, autonomy, and acceptance in families [83, 86]. For example, in light of financial costs associated with illness, one paper suggested that providers could use the eco-map to specifically identify unpaid support to address expenses by asking, "How can Uncle Charlie be of help?" [22].

Some study authors reported their findings on a broader system and cultural level. For example, the findings from several studies highlighted the need for intersectoral and multiprofessional action by healthcare providers to identify existing and potential resources within larger networks of health and social care [22, 50, 63, 85]. At the same time, another study asked about the dominant culture supporting minority cultures to achieve a sense of belonging [53]. Last, several studies referred to public health and social policies and initiatives to support more vulnerable populations like older adults, children with chronic conditions, and employed mothers by bolstering "health promotion strategies" and resources [48, 68, 85, 102].

4. Discussion

This review aimed to understand where and how eco-maps have been used in health services research, service design, and delivery. We identified 70 studies employing eco-mapping in the context of health services research published before January 16, 2023. We discovered that thirty-six studies were published in the past six years, and most studies originated from Brazil and relied on qualitative data. The recent increase in the scientific output featuring eco-mapping compared to prior years may respond to the heightened focus on social connectedness as a social determinant of health [5]. Eco-mapping as an organizing framework offers a simple way of assessing the structure and functions of personal and familial social networks. Similarly, the high publication rate in Brazil could be due to the country's widely adopted use of the Calgary Family Assessment Model, which includes the eco-map tool [107].

As a simple pen-and-paper tool offering a "bird's eye view" of the whole individual or family situation, this scoping review has proven the effectiveness of the eco-map across various research objectives, populations, and settings. The eco-map's value, according to many of the included studies, was its visual presentation of the data in the form of the social support network and the strength of these relationships for individuals and families. Therefore, some individuals who are nonverbal, younger participants, or those who find verbal expression challenging may find

engaging through the eco-map beneficial to their participation in health services planning and research [24, 108]. However, emerging research is exploring the validity and reliability of the tool compared to established social support measurement scales (i.e., the Multidimensional Scale of Perceived Social Support) [109]. Our review found that eco-maps' hard-copy format was sometimes created using computer software [51, 52, 65, 84, 91] and, in one example, integrated into a web-based application being studied to support families of those with an acquired brain injury [105]. The creation of an electronic eco-map in primary care has been referred to in other work [110]. This holds promise for designing a user-friendly eco-map that clinicians can easily update.

Our scoping review also found that the eco-map tool tended to be positioned as a data collection strategy for documenting social support networks and their nuances at microlevels. However, the potential for large-scale impact was captured in the "eco-map of aging assets," which acted as a repository of resources among older adults living in the community [18]. As an example of large-scale impact, the asset eco-map could be used as an assessment framework to assist community members in understanding, accessing, and maintaining community-oriented assets. The finding aligns with other eco-mapping literature that informed large-scale awareness and action on public health measures (i.e., virus transmission and TB surveillance and acquisition of medicine) and health services planning [51, 111–113]. While there is more interest in patient engagement in health services research involving active and meaningful collaboration between researchers, patients, and families [114], there is limited awareness of tools to support this process [33]. Our review showed that eco-mapping was often deployed to support conversations between academics and participants about their social support networks or access to support and resources [21, 53, 54, 57, 80, 97]. However, the eco-map has not traditionally been considered a tool for increasing engagement in health services, unlike other areas outside health care that have used it for "creative engagement" [115, 116].

(1) Research Implications. Several important health services implications should be considered from the included studies. Social support denoted in an eco-map does not guarantee the provision of support [42, 58, 97]. However, the dialogue to create an eco-map could facilitate conversations about care expectations [42], identification of vulnerable points or risk factors [47, 64, 66, 74, 94, 103], and actions to improve family and individual functioning (e.g., self-management behaviours and disease management) [41, 44–46, 55, 58, 65, 98, 101, 104]. It may also enable healthcare professionals and researchers to understand better family dynamics and their cultural and structural factors to tailor communication and support strategies and initiatives at the individual and public health levels [21, 49, 57, 68, 72–74, 84, 87, 95, 100–102]. Many studies also highlighted the importance of understanding available resources supporting the patient and the family unit to meet the needs of various populations [17, 18, 22, 49, 50,

53, 58, 70, 92, 93, 97]. Finally, several studies commented on family oriented approaches to regular assessments and interventions depending on the area of focus that eco-mapping could reinforce (e.g., caring for older adults, children with visual impairment, etc.) [62, 69, 75, 77, 79, 81, 82, 88, 89, 99, 105]. Despite strong evidence indicating the association between high social support and better health outcomes [117], challenges persist in developing strategies and initiatives that target social network size and quality [118]. Eco-maps can identify existing resources and help uncover needed support and barriers to obtaining support [23]. Examining these social networks could also support service integration based on individual and community needs [6] at meso- and macrosystem levels.

4.1. Study Limitations and Future Directions. We predefined health services research based on a widely used and accepted definition by CIHR [2], and additional sources were not searched. We may have included additional studies if we used another definition or additional data sources. While data extraction was performed independently by several reviewers and verified, only one researcher analyzed (i.e., coded and categorized data); however, all study authors reviewed and accepted the findings. There were also abundant studies from Brazil, with fewer from other parts of the world. These studies reported on the use of eco-maps within a particular healthcare context, and as such, there was less evidence relating to applying the tool in other jurisdictions. While the setting of the application may not affect the use of the data yielded by the eco-map, further research in different countries may establish better transferability of findings to other health systems.

5. Conclusion

This scoping review has contributed to the evidence on the application of eco-mapping in health services research, demonstrating the promise it brings to addressing vulnerable populations and system transformation. However, a significant gap remains in the knowledge and use of eco-maps in identifying population service and resource gaps and how to bridge the knowledge-to-action chasm better. Further exploration is needed to examine how to optimize the application of eco-mapping in the health services context, including generating guidelines, templates, or instructions for implementation. Therefore, addressing this gap is vital for ensuring eco-mapping informs future service design and policy changes.

Data Availability

The data supporting this scoping review are from published studies that have been cited.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

Supplementary Materials

Supplemental File 1: Medline search strategy. Supplemental File 2: Study characteristics table. (*Supplementary Materials*)

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