

Article

Living with Carotid Artery Stenosis: A Qualitative Study on the Role of the Social Determinants of Health

Davide Costa ^{1,2,*} , Michele Andreucci ^{1,2} , Vincenzo Daloiso ^{1,2}, Antonio Isaja ³, Francesca Noce ³, Giulio Accarino ^{2,3} , Umberto Marcello Bracale ^{2,3}  and Raffaele Serra ^{1,2,*} 

¹ Department of Medical and Surgical Sciences, Magna Graecia University of Catanzaro, 88100 Catanzaro, Italy; andreucci@unicz.it (M.A.); vinci99dalo@gmail.com (V.D.)

² Interuniversity Center of Phlebology (CIFI), Magna Graecia University, 88100 Catanzaro, Italy; g.accarino@live.it (G.A.); umbertomarcello.bracale@unina.it (U.M.B.)

³ Department of Public Health, University Federico II of Naples, 80131 Naples, Italy; antonio.isaja1@gmail.com (A.I.); francescanoce1994@gmail.com (F.N.)

* Correspondence: davide.costa@unicz.it (D.C.); rserra@unicz.it (R.S.)

Abstract

Carotid artery stenosis (CAS) is a major cause of ischemic stroke, yet little is known about how social determinants of health (SDHs) shape patients' experiences beyond biomedical risk factors. This qualitative study explored how individuals living with CAS perceive the influence of SDHs across their illness trajectory. Semi-structured interviews were conducted with 30 adults receiving care at two Italian vascular surgery units. Data were analyzed using reflexive thematic analysis, guided deductively by the Centers for Disease Control and Prevention (CDC) five-domain SDH framework. Participants described CAS as an experience embedded within broader social conditions rather than solely a vascular disease. Economic resources influenced access to healthcare, healthy lifestyles, and treatment adherence; fragmented healthcare pathways, geographical barriers, and limited continuity of care complicated disease management; health literacy shaped understanding of the disease and engagement in self-management; neighborhood characteristics affected opportunities for prevention and physical activity; and family and community support represented essential resources for coping and navigating healthcare. These determinants interacted throughout the illness trajectory rather than operating independently. The findings indicate that effective CAS management extends beyond clinical treatment and requires integrating SDH assessment into routine vascular care to support person-centered management, strengthen treatment engagement, and reduce health inequalities.

Keywords: carotid artery stenosis; social determinants of health; health inequities; qualitative study; CDC five-domain framework



Academic Editor: Joaquim J.F. Soares

Received: 14 July 2026

Revised: 4 October 2026

Accepted: 5 October 2026

Published: 7 October 2026

Copyright: © 2026 by the authors.

Licensee MDPI, Basel, Switzerland.

This article is an open access article distributed under the terms and

conditions of the [Creative Commons Attribution \(CC BY\)](https://creativecommons.org/licenses/by/4.0/) license.

1. Introduction

CAS is one of the most clinically relevant manifestations of systemic atherosclerosis and remains a major cause of ischemic stroke, accounting for approximately 15–20% of cerebrovascular events. Although advances in vascular prevention have contributed to reductions in stroke incidence in many countries, population ageing and the increasing prevalence of cardiometabolic risk factors continue to sustain a substantial burden of carotid artery disease. CAS is therefore recognized not only as an important cause of stroke but also as a marker of generalized atherosclerosis and future vascular risk [1–3].

Carotid atherosclerosis develops progressively from increased carotid intima-media thickness (cIMT) to plaque formation and ultimately hemodynamically significant stenosis through chronic endothelial dysfunction, lipid accumulation, inflammation, and vascular remodeling [4]. Because this process frequently remains clinically silent until a transient ischemic attack (TIA) or stroke occurs, carotid ultrasonography has become an established non-invasive method for assessing both local vascular disease and systemic atherosclerotic burden [5,6]. The global magnitude of carotid atherosclerosis is considerable. Recent studies estimated that increased cIMT affects approximately 27.6% of adults aged 30–79 years worldwide, carotid plaque is present in 21.1%, and carotid stenosis affects nearly 1.5%, corresponding to almost 58 million individuals [7]. Prevalence rises sharply with age, is consistently higher in men, and varies across geographic regions and ethnic groups. Smoking, hypertension, diabetes mellitus, dyslipidaemia, obesity, and physical inactivity remain among the principal modifiable drivers of carotid atherosclerosis [5].

Most patients are asymptomatic at diagnosis, with asymptomatic carotid stenosis (ACS) representing the most common clinical presentation. Moderate ($\geq 50\%$) ACS affects approximately 2–3% of the general population, whereas severe stenosis ($\geq 70\%$) is found in fewer than 1%, with prevalence increasing markedly with age [8]. Importantly, the natural history and management of ACS have changed substantially over the past three decades. A 2023 systematic review and meta-analysis demonstrated that the annual incidence of ipsilateral ischemic stroke among medically treated patients is now approximately 1% and has declined by 24% for every five-year increase in the recruitment period, reflecting the widespread adoption of intensive lipid-lowering therapy, improved blood pressure control, smoking cessation, antiplatelet therapy, and comprehensive vascular risk-factor management. Consequently, contemporary practice increasingly favors intensive best medical therapy, reserving carotid revascularization for carefully selected high-risk patients [9].

This evolution in the management of CAS has increased the importance of understanding the conditions that enable patients to participate effectively in long-term prevention and disease management. Smoking cessation, healthy dietary patterns, physical activity, medication adherence, regular clinical surveillance, and adequate control of vascular risk factors cannot be understood exclusively as individual choices [10]. Rather, these behaviors are shaped by cognitive, psychological, cultural, economic, and social circumstances, as well as by the accessibility and organization of healthcare. Effective prevention and management of CAS therefore require consideration not only of biological risk and evidence-based pharmacological or interventional therapies, but also of the broader conditions that influence patients' capacity to engage with prevention, treatment, and follow-up [11,12].

SDHs provide an important conceptual framework through which these conditions can be examined. SDHs encompass the social, economic, environmental, and political circumstances that shape opportunities for health throughout the life course [13]. Rather than acting as isolated risk factors, SDHs represent interconnected processes influencing exposure to disease, health-related behaviors, access to healthcare, treatment adherence, and the resources available to individuals for managing chronic conditions [14]. Over the past three decades, a substantial body of research has demonstrated that health inequalities are closely associated with unequal distributions of resources and opportunities, thereby shifting attention beyond individual lifestyles toward the broader social contexts in which health and illness are produced [15].

Several conceptual frameworks have been proposed to explain these relationships. The Dahlgren and Whitehead model conceptualizes health as the product of nested layers of influence extending from individual characteristics and lifestyles to social networks, living and working conditions, and wider socioeconomic, cultural, and environmental circumstances [16]. Similarly, the World Health Organization Commission on SDHs distinguishes

between structural determinants, which influence individuals' social position through political, economic, and governance systems, and intermediary determinants, including material conditions, psychosocial circumstances, behavioral factors, and healthcare access, through which social inequalities may become biologically embodied [17]. These models provide an important theoretical basis for understanding health inequities but encompass broad and complex levels of social organization that can be challenging to operationalize consistently within patient-centered empirical research.

For this reason, the present study adopted the five-domain framework developed by the CDC, which organizes SDHs into economic stability, education access and quality, healthcare access and quality, neighborhood and built environment, and social and community context [18,19]. The CDC framework was selected because its clearly defined domains provide an operational structure through which multiple dimensions of patients' social environments can be systematically explored while avoiding the reduction in social disadvantage to a single indicator such as income, educational attainment, or employment. Its multidimensional organization is particularly suitable for qualitative investigation because it provides a common analytical structure while permitting examination of how different social conditions intersect within individual illness trajectories [20]. Nevertheless, the framework also has limitations. The separation of SDHs into discrete domains may simplify social processes that are intrinsically interconnected, boundaries between domains may overlap, and a framework developed within the U.S. public-health context may not fully capture the institutional, cultural, and territorial characteristics of other healthcare systems [21]. Accordingly, in the present study, the CDC framework was used as an organizing and interpretative guide rather than as a rigid classification system, allowing participants' narratives to reveal relationships and interactions extending across individual domains.

The relevance of this approach is supported by growing evidence that SDHs substantially influence vascular health. Social disadvantage has been associated not only with a higher prevalence of vascular risk factors but also with delayed diagnosis, reduced access to preventive services, lower adherence to treatment, and worse clinical outcomes [22]. These associations are increasingly interpreted as consequences of cumulative social exposures operating across the life course rather than as the effects of individual socioeconomic variables alone. Similar patterns have been described in peripheral arterial disease, abdominal aortic aneurysm, and cerebrovascular disease, where differences in social circumstances are associated with variation in presentation, access to specialist care, treatment pathways, and outcomes [23]. Vascular diseases should therefore be considered not only in relation to their biological mechanisms but also within the social organization of healthcare, the availability of community resources, and the material circumstances in which patients live [24].

These considerations are particularly relevant to the present study, which was conducted in Calabria and Campania in Southern Italy. Examining CAS in this setting provides an opportunity to explore how economic circumstances, educational resources, healthcare accessibility, neighborhood characteristics, and social and community relationships are experienced by patients within a specific regional and healthcare context. Rather than assuming that geographical location itself determines health disadvantage, investigating two Southern Italian regions allows attention to be directed toward the ways in which territorial and social conditions may interact with individual circumstances and healthcare pathways. Such a context-sensitive perspective is especially important for a chronic and frequently asymptomatic vascular condition in which prevention, surveillance, adherence, and continuity of care play central roles in long-term management.

Despite increasing recognition of the importance of SDHs in vascular disease, their influence on CAS remains insufficiently understood. Existing research has primarily examined isolated indicators of social disadvantage, such as socioeconomic status, insurance

coverage, race and ethnicity, or neighborhood deprivation, demonstrating disparities in disease burden, access to carotid imaging, revascularization, and postoperative outcomes [25]. However, this evidence has largely been derived from quantitative analyses of administrative databases and clinical registries, in which social factors are typically treated as independent variables rather than as interconnected dimensions of patients' everyday lives. Consequently, considerably less is known about how individuals living with CAS perceive the ways in which economic, educational, healthcare, environmental, and social circumstances interact across their pathways from diagnosis to treatment and long-term disease management [26].

Qualitative research is particularly well positioned to address this knowledge gap because it can examine how patients interpret and make sense of the social contexts in which illness unfolds and identify mechanisms and experiences that may remain inaccessible through quantitative approaches [27]. Moreover, applying a multidimensional SDH framework to patients' narratives makes it possible to investigate not merely whether social inequalities are associated with CAS, but how such conditions are experienced and how they may influence healthcare trajectories and long-term management. Guided by the CDC five-domain framework, this study therefore asks: How do individuals living with CAS perceive and experience the influence of SDHs across their illness trajectory? Accordingly, the aim of this study was to explore how SDHs shape patients' understandings of disease onset, healthcare experiences, treatment, and long-term management in Calabria and Campania, thereby generating context-sensitive insights that may contribute to more equitable and socially responsive models of vascular care.

2. Materials and Methods

2.1. Study Design

This qualitative study employed semi-structured interviews to explore how individuals living with CAS perceive and experience the influence of SDHs throughout their illness trajectory. A theory-informed deductive qualitative design was adopted, using the CDC five-domain framework on SDHs as the conceptual foundation for both the development of the interview guide and the analytical process [19]. This approach enabled a systematic exploration of participants' experiences across the five domains, economic stability, education access and quality, healthcare access and quality, neighborhood and built environment, and social and community context, while remaining open to the complexity and contextual nuances of individual narratives. A qualitative methodology was considered particularly appropriate because it facilitates an in-depth understanding of how social conditions are perceived, interpreted, and integrated into patients' experiences of disease, generating insights that cannot be adequately captured through quantitative approaches alone.

2.2. Participants and Setting

Participants were adults diagnosed with CAS who were receiving follow-up or treatment at the Vascular Surgery Units of the University Magna Graecia of Catanzaro and the Federico II University Hospital of Naples, Italy. Eligible participants were aged 18 years or older, had a confirmed diagnosis of CAS established through standard clinical and imaging criteria, and were able to communicate effectively in Italian and provide informed consent. Individuals with severe cognitive impairment, acute neurological conditions preventing participation in an interview, or significant communication difficulties were excluded.

Purposive sampling was used to recruit information-rich participants capable of providing detailed accounts of their experiences with CAS and the influence of SDHs on their illness trajectory. To maximize variation in perspectives, sampling sought diversity in age, sex, educational attainment, employment status, marital status, place of residence,

clinical presentation, treatment pathway (medical management, carotid endarterectomy, or carotid artery stenting), and time since diagnosis. Participants represented a broad range of demographic, socioeconomic, and clinical characteristics, thereby ensuring diversity in the experiences and perspectives captured.

Recruitment was conducted consecutively during outpatient follow-up visits and inpatient admissions at the participating Vascular Surgery Units between November 2025 and April 2026. Eligible patients were approached by a member of the research team, who explained the study objectives and procedures before obtaining written informed consent. Recruitment continued until data sufficiency was achieved, that is, when the dataset was considered to provide adequate depth, diversity, and conceptual richness to address the research question. Consistent with the principles of reflexive thematic analysis, the objective was not to achieve data saturation as a predetermined endpoint but rather to ensure sufficient information power to support the development of nuanced and analytically robust themes.

2.3. Data Collection

Following a review of the literature on SDHs and CAS, a semi-structured interview guide was developed using the CDC five-domain framework as its conceptual foundation [19]. The interview guide was subsequently reviewed by researchers with expertise in qualitative research and vascular health to ensure clarity, relevance, and alignment with the study objectives.

The interview guide consisted of open-ended questions designed to explore participants' experiences across the five SDH domains: (1) neighborhood and built environment, including perceptions of environmental conditions and their influence on vascular health; (2) social and community context, focusing on social relationships, emotional support, and the impact of CAS on daily life; (3) healthcare access and quality, exploring participants' diagnostic and treatment pathways, barriers to healthcare, and relationships with healthcare professionals; (4) education access and quality, examining health literacy, understanding of the disease, and the role of information in treatment adherence; and (5) economic stability, investigating the influence of financial circumstances, employment, and material resources on disease management and quality of life. The complete interview guide is presented in Table 1.

Table 1. Semi-structured interview guide based on the CDC five-domain framework on SDHs.

CDC Domain	Area Explored	Example Interview Questions	Possible Probes
Neighborhood and built environment	Perceptions of the living environment and its influence on vascular health	How would you describe the neighborhood or community where you live?; In what ways do you think your living environment has influenced your health, particularly regarding CAS?	Air quality, traffic, green spaces, neighborhood safety, environmental pollution, access to services, prevention, environmental awareness

Table 1. *Cont.*

CDC Domain	Area Explored	Example Interview Questions	Possible Probes
Social and community context	Social relationships, emotional support, and everyday experiences of living with CAS	How would you describe your daily life living with CAS?; How has the diagnosis affected your relationships with family, friends, or your community?	Emotional support, caregiving, loneliness, social isolation, coping strategies, community resources
Healthcare access and quality	Experiences with diagnosis, treatment, and healthcare services	How would you describe your journey through the healthcare system from diagnosis to the present?; Have you experienced any difficulties accessing appointments, examinations, or treatments?	Waiting times, distance from healthcare facilities, communication with healthcare professionals, continuity of care, unmet healthcare needs
Education access and quality	Health literacy and understanding of the disease	Do you think your educational background has helped you understand your condition and treatment?; Were the medical information and explanations you received clear and understandable?	Understanding of CAS, treatment adherence, communication, decision-making, informational needs
Economic stability	Financial resources, employment, and material conditions affecting disease management	Has your financial situation influenced your experience with CAS?; Has the disease affected your employment or financial situation?	Medication affordability, transportation costs, healthy diet, healthcare expenses, employment changes, caregiver burden, financial concerns

Interviews were conducted by the principal investigator (DC), who had received formal training in qualitative interviewing techniques and had previous experience in conducting health-related qualitative research. Each interview lasted approximately 60–90 min and was conducted in a private setting within the participating hospitals or, when preferred by participants or required for organizational reasons, through a secure online videoconferencing platform. The interviewer adopted a flexible interviewing style, using follow-up questions and prompts to encourage participants to elaborate on issues they considered meaningful while ensuring that all key topics of the interview guide were addressed.

All interviews were conducted in Italian, the native language of both participants and the interviewer, to facilitate depth of expression and preserve contextual and cultural nuances. With participants' written consent, interviews were audio-recorded and subsequently transcribed verbatim by DC and RS. Each transcript was subsequently checked against the corresponding audio recording by the researchers to verify transcription accuracy and correct any omissions or discrepancies before analysis. Field notes were recorded immediately after each interview to document contextual observations, non-verbal cues, and preliminary analytical reflections that informed the subsequent stages of data analysis. No translation was undertaken during data collection, transcription, or the initial stages of analysis. For publication purposes, quotations included in the manuscript were translated into English by the research team, with particular attention to preserving the original meaning, tone, and contextual nuances of participants' narratives.

2.4. Data Analysis

Two researchers conducted a reflexive thematic analysis following Braun and Clarke [28]. Given the theoretical orientation of the study, a predominantly deductive approach was adopted, with the five CDC SDH domains providing the initial analytical framework. These domains served as broad organizing categories rather than as a fixed or predetermined codebook, while specific codes were generated and progressively refined through interpretative engagement with participants' accounts.

Both researchers initially familiarized themselves with the dataset through repeated reading of the transcripts and the recording of preliminary analytical observations. An initial subset of interviews was then independently coded by both researchers to develop and refine a provisional coding structure within the five CDC domains. This preliminary stage was used to explore the range of meanings represented in participants' accounts, clarify the conceptual boundaries of the initial codes, identify overlapping or insufficiently differentiated codes, and highlight areas requiring further analytical attention. The researchers subsequently compared their interpretations through reflexive discussion and used these exchanges to refine the provisional coding structure before proceeding to the complete dataset.

Both researchers then independently coded the full dataset using the evolving coding structure as an analytical guide rather than as a fixed coding scheme. An Excel spreadsheet was used to document and organize the evolving coding structure, with codes organized in relation to the relevant CDC domains and corresponding data extracts, while successive modifications to code labels and conceptual boundaries were recorded throughout the analytical process. Coding remained iterative and recursive: as engagement with the dataset progressed, codes were reviewed across interviews and, where analytically appropriate, merged, differentiated, renamed, expanded, or refined. This process allowed the deductive structure provided by the CDC framework to remain responsive to meanings, relationships, and contextual dimensions identified within participants' narratives.

Following independent coding, the researchers brought their respective analyses together through a series of reflexive analytic discussions. The coding structures, interpretative observations, and emerging patterns identified by each researcher were systematically compared, and points of convergence and divergence were examined through renewed engagement with the underlying data. These discussions were not intended to establish coding agreement or determine a single objectively correct interpretation; rather, differences between the researchers' readings were used as opportunities to interrogate assumptions, reconsider coding decisions, and deepen the developing interpretation.

Conceptually related codes were subsequently examined across interviews and progressively organized into broader interpretative categories. These categories were com-

pared within and across the five CDC domains to identify recurrent patterns of meaning and relationships across participants' accounts, from which candidate themes were developed. Candidate themes were then repeatedly reviewed against both the coded extracts and the wider dataset and refined in terms of their scope, internal coherence, distinctiveness, and relevance to the research question. Particular attention was also given to divergent, contrasting, or less common accounts capable of qualifying or complicating the dominant patterns identified in the analysis.

Through this iterative process, the independently developed analyses of the two researchers were progressively integrated into the development and refinement of categories and themes while preserving the reflexive character of the analytical approach. The final themes therefore represented patterned interpretative meanings generated through sustained engagement with participants' narratives, while remaining theoretically anchored in the CDC SDH framework.

2.5. Reflexivity and Methodological Integrity

Reflexivity was central to the research process and was understood not only as a procedural safeguard but also as an active analytic resource shaping interpretation. The research team, composed of scholars with backgrounds in sociology, medical humanities, and health services research, entered the study with different epistemological sensitivities that influenced how the data were initially perceived and later interpreted.

From the outset, the sociological orientation of some researchers led to a heightened attentiveness to structural determinants of healthcare experiences, including institutional power asymmetries, professional authority, and the role of organizational constraints. This sometimes risked privileging systemic explanations over individual narrative complexity. Conversely, researchers with a medical humanities background were more inclined to foreground experiential, emotional, and narrative dimensions of care, which occasionally led to a stronger empathic reading of participants' accounts and a tendency to interpret distress in relational rather than structural terms. Awareness of these complementary but potentially competing interpretative tendencies became a key part of the reflexive process.

These positionalities were explicitly discussed during team meetings and analytic discussions, where researchers actively questioned how their disciplinary lenses shaped coding decisions and theme development. For example, early interpretations of patient dissatisfaction were repeatedly examined to distinguish whether they reflected participants' accounts or researchers' implicit expectations about healthcare systems. Similarly, there was ongoing critical reflection on the risk of over-pathologizing certain narratives of suffering, particularly when interpreting accounts of marginalization in clinical settings.

Analytic memos were used not only to document emerging themes but also to record moments of uncertainty, emotional responses to the data, and instances where prior assumptions appeared to influence interpretation. Rather than attempting to eliminate these influences, the team treated them as part of the analytic process, using them to deepen engagement with the data and to surface alternative interpretations.

Coding and theme development were therefore iterative and grounded in continuous comparison across interviews, but also explicitly informed by reflexive dialogue about how meaning was being constructed. Researcher triangulation did not aim solely at consensus but at productive tension between different interpretative positions, allowing divergent readings to be explored rather than prematurely resolved.

In line with contemporary qualitative reporting guidance, reflexivity was approached as a values-based practice that acknowledges the situated nature of knowledge production [29]. This strengthened methodological integrity by making visible how researcher positioning shaped, but did not determine, the analytical outcomes.

Moreover, to ensure the quality and richness of the data, several procedures were adopted throughout data collection. All interviews were conducted by the same trained and experienced qualitative interviewer using a semi-structured interview guide, which ensured coverage of the core study domains while allowing participants to elaborate on issues relevant to their individual experiences. Follow-up questions and probes were used to clarify responses and explore emerging issues in greater depth. Interviews were audio-recorded and transcribed verbatim, and each transcript was subsequently checked against the corresponding audio recording to identify and correct any omissions or transcription discrepancies. Field notes recorded immediately after the interviews provided additional contextual information and supported subsequent interpretation. Data quality was further supported during analysis through repeated engagement with the transcripts, independent coding by two researchers, reflexive analytic discussions, iterative comparison of codes and themes with the underlying data, and explicit consideration of divergent, contrasting, or less common accounts.

2.6. Ethical Approval

The study received ethical approval from the Institutional Review Board of the Institutional Review Board of the Interuniversity Center of Phlebology (CIFL) International Research and Educational Program in Clinical and Experimental Biotechnology (approval code: of E.R.ALL.2018.72.A.). Prior to participation, all participants received comprehensive information regarding the study objectives, interview procedures, data handling, and measures adopted to ensure confidentiality and privacy. Written informed consent was obtained from all participants before data collection commenced. Throughout the interviews, participants were reminded that their involvement was entirely voluntary and that they could decline to answer any question or withdraw from the study at any stage without any consequences. To safeguard anonymity, all interview transcripts were pseudonymized, and any potentially identifiable information was removed before analysis and publication. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

3. Results

3.1. Sociodemographic Characteristics of the Participants

Thirty patients with CAS participated in the study. Participants ranged in age from 54 to 82 years (mean age 69.2 ± 6.5 years). The sample comprised 22 men (73.3%) and 8 women (26.7%). Participants were recruited from the Vascular Surgery Units of University Magna Graecia of Catanzaro and the Federico II University Hospital of Naples. Most participants were retired ($n = 25$), reflecting the age profile typically associated with CAS. Previous occupations encompassed a wide range of manual, technical, administrative, healthcare, educational, and commercial professions, while the remaining participants included employed individuals, self-employed workers, part-time employees, and housewives, providing diversity in socioeconomic and occupational backgrounds. The degree of carotid stenosis ranged from 60% to 90%. Nine participants (30.0%) had experienced symptomatic CAS, presenting with either TIA or amaurosis fugax, whereas the remaining participants were asymptomatic at the time of diagnosis. Hypertension was present in all participants, whereas diabetes mellitus affected six participants (20.0%). Dyslipidemia and hypercholesterolemia were reported across the entire sample. Body mass index ranged from 22.1 to 31.2 kg/m², indicating a population predominantly classified as overweight. Detailed participant characteristics are presented in Supplementary Material Table S1.

3.2. Overview of the Thematic Findings

Analysis of the interviews generated five overarching themes corresponding to the five domains of the Centers for CDC framework on SDHs. Although the analytical structure was deductively informed by the CDC framework, the themes were grounded in participants' lived experiences rather than representing descriptive summaries of predefined categories. The five themes reflected distinct dimensions of participants' experiences of CAS, including economic circumstances, educational experiences, access to and experiences with healthcare, neighborhood and environmental conditions, and social and community relationships. The following sections present the findings according to the five CDC domains: Economic Stability, Education Access and Quality, Healthcare Access and Quality, Neighborhood and Built Environment, and Social and Community Context. Within each domain, participants' narratives are presented to illustrate their experiences of CAS and their interactions with healthcare services throughout the course of the disease.

3.3. Economic Stability: Financial Resources as Enablers and Constraints Across the Care Trajectory

Economic stability emerged across participants' accounts as extending beyond the affordability of healthcare, with financial resources described as relevant to multiple stages of living with CAS. This was a widely shared concern, although its implications varied according to participants' individual economic circumstances. Financial resources influenced the ability to respond to the diagnosis, navigate the healthcare system, adhere to treatment recommendations, adopt healthier lifestyles, and cope with the uncertainty associated with a potentially life-threatening condition. For participants experiencing greater financial security, economic resources could provide autonomy, continuity of care, and reassurance, whereas narratives of financial vulnerability emphasized anxiety and more limited opportunities to engage fully with disease management. Economic stability was therefore experienced not solely in terms of income or healthcare expenditure, but also through the practical possibilities and constraints surrounding everyday management of the illness.

Among participants reporting limited financial resources, a recurrent experience was the need to negotiate competing priorities while living with CAS. Costs associated with examinations, transportation, and lifestyle modification could accumulate after diagnosis and become more visible as the demands of ongoing care increased. As illustrated by one participant:

"Yes, very much. Starting with the trips made to go for various examinations, some obviously in private clinics, and healthier food, which costs much more than what I used to eat before. These are things you don't notice until you're right in the middle of it" (P01)

For some participants, these pressures required healthcare-related expenditure to be weighed against other essential household needs. The consequences were not described exclusively in material terms; financial strain could also generate concern about the ability to sustain care over time. This experience was clearly expressed by one interviewee:

"Directly, not very much, because I don't work anymore. But indirectly, yes. Healthcare costs and transportation weigh on an already reduced pension, and this inevitably increases anxiety and stress." (P02)

The relationship between economic constraints and everyday disease management was particularly evident in accounts concerning medication, diagnostic investigations, transportation, and dietary recommendations. In a number of narratives, these were not

perceived as separate expenses but as competing demands on limited household resources. One participant summarized the difficulty of balancing them:

"Sometimes I have to choose between buying drugs, doing tests or eating healthier food. . . The illness affects not only the body, but also the peace of everyday life." (P06)

Other accounts revealed different manifestations of the same underlying constraint, such as postponing investigations, limiting travel for medical appointments, or worrying that future healthcare costs might become unaffordable. These experiences were not universal, but they demonstrate how financial limitations could affect both immediate healthcare choices and perceptions of future security.

A contrasting perspective emerged among participants with stable pensions, accumulated savings, or dual household incomes. For these individuals, economic security was more often described as a resource that increased flexibility in responding to healthcare needs. Financial stability did not eliminate the costs associated with CAS, but it could allow unexpected expenses to be absorbed without substantially disrupting other areas of daily life. Some participants, for example, reported being able to choose private consultations or diagnostic investigations when they wished to avoid prolonged waiting times within the public healthcare system. For those able to afford this option, expenditure on private care was sometimes viewed less as a financial burden than as a means of obtaining more timely access to services. As one participant explained:

"Fortunately, I can afford some private visits and examinations when necessary. It is an additional expense, of course, but it means I don't have to wait too long and I feel more secure knowing that I can get the care I need." (P12)

Likewise, another participant emphasized that the ability to pay for private diagnostic tests substantially accelerated access to treatment, although this required considerable financial sacrifice. Thus, even among those with greater economic resources, the financial implications of CAS remained present, but their consequences for access to care differed from those described by participants experiencing more substantial economic constraints.

Economic circumstances were also relevant to participants' capacity to implement lifestyle modifications recommended after diagnosis. Maintaining a healthier diet, travelling for specialist follow-up, engaging in preventive care, and sustaining long-term treatment were described in some accounts as requiring material resources in addition to personal motivation. This perspective complicated an exclusively individual understanding of adherence by showing how the practical ability to follow clinical recommendations could depend partly on the resources available to patients. One participant connected these material needs with the potential value of broader forms of support:

"Economic support would allow me to attend all necessary visits without anxiety, buy healthier food and have a more normal life. Social support, such as a group of patients with my condition or accompaniment services for visits, would greatly reduce stress and loneliness." (P25)

Participants' accounts revealed considerable diversity in how economic circumstances were experienced in relation to CAS. Financial constraints were particularly salient among those who had to balance healthcare costs against other household needs, whereas greater economic security could provide additional flexibility in accessing services and responding to the practical demands of disease management. The findings therefore indicate that the relevance of economic stability extended beyond direct healthcare expenditure and was reflected in participants' differing capacities to navigate the everyday requirements associated with CAS.

3.4. Neighborhood and Built Environment: Living in Environments That Shape Vascular Health

The physical environment emerged across participants' accounts as an important component of their health experience rather than simply a neutral backdrop to everyday life. A broadly shared perception was that neighborhood characteristics could either facilitate or constrain the adoption of healthy behaviors following the diagnosis of CAS, although the relevance attributed to specific environmental features varied according to participants' living circumstances. Participants linked opportunities for physical activity, access to healthy food, attendance at healthcare appointments, and psychological well-being to characteristics of the environments in which they lived. For some, these environmental conditions were particularly salient in their attempts to implement lifestyle recommendations following diagnosis. As one interviewee explained:

"The environment where you live matters much more than people think. If there are parks, safe places to walk and nearby services, it becomes easier to take care of yourself every day." (P07)

One of the more recurrent environmental concerns involved the perceived inadequacy of neighborhood infrastructure. Participants who reported such difficulties referred to deteriorated roads, limited sidewalks, scarce green spaces, heavy traffic, and poor public maintenance as barriers to walking and outdoor physical activity. This issue was particularly evident in accounts from individuals who had been advised by healthcare professionals to remain physically active but felt that their immediate surroundings did not provide safe or accessible spaces in which to do so. As one participant observed:

"In my neighborhood there are no proper sidewalks, and the roads are not safe. My doctor tells me to walk every day, but honestly I don't know where I can do it safely." (P05)

Related accounts illustrated the practical difficulty of translating medical recommendations into everyday behavior when neighborhood conditions were perceived as unfavorable. At the same time, these barriers were not presented as universal experiences, indicating that opportunities to implement lifestyle recommendations differed according to the environments in which participants lived.

A further set of narratives connected neighborhood characteristics with broader aspects of vascular health. Among participants who raised these concerns, limited availability of affordable fresh food, environmental degradation, traffic-related pollution, and the absence of community spaces were described as potentially relevant to both physical and psychological well-being. Some participants associated prolonged exposure to these conditions with chronic stress, sedentary lifestyles, and unhealthy dietary habits, which they perceived as potentially increasing vascular risk. These accounts tended to describe environmental factors cumulatively rather than as separate influences, although the degree of concern attributed to them differed between participants. One patient reflected on this cumulative perception:

"It is not just one thing. It is the traffic, the stress, the lack of green spaces and even finding healthy food nearby. Little by little, all these things affect your health." (P18)

Environmental exposures represented a somewhat different dimension of participants' accounts. A number of participants expressed uncertainty about local air quality, water safety, or environmental pollutants and acknowledged having limited information about their possible health effects. Among those who raised this issue, there was interest in receiving practical and accessible information about whether and how such exposures might relate to vascular disease. This concern was therefore not necessarily shared with the same prominence by all participants, but it represented a distinct informational need within some narratives. One participant remarked:

“I would like someone to explain whether the air I breathe or the environment where I live can really influence my disease. We hear many things, but we never know what is true.”
(P09)

These accounts revealed both commonalities and variation in how participants perceived the relationship between their living environment and CAS. Concerns about opportunities for physical activity and the accessibility of neighborhood resources recurred across multiple narratives, whereas specific concerns about environmental exposures and environmental health information were more prominent in some accounts than in others. Participants’ experiences therefore reflected different ways in which neighborhood conditions could facilitate or constrain healthier lifestyles and influence their perceived ability to manage their health within the environments in which they lived.

3.5. Healthcare Access and Quality: Navigating a Complex and Fragmented Care Pathway

Healthcare experiences occupied a prominent place in participants’ accounts of living with CAS, extending beyond clinical consultations and diagnostic procedures. A broadly recurring feature of these narratives was the practical work required to manage appointments, transportation, administrative requirements, financial demands, and the emotional consequences of ongoing surveillance. For participants who encountered these difficulties, access to care was experienced as a multidimensional process in which organizational and logistical demands accompanied the clinical management of the disease. The extent of this burden varied according to individual circumstances and available resources, but some participants described the effort required to maintain continuity of care as an additional challenge associated with the illness itself. As one patient described:

“When I wake up in the morning, the first thing I do is measure my blood pressure. Then I take a series of medications: to lower cholesterol, to thin the blood, for blood pressure. Even leaving the house, I never feel completely calm. Every medical appointment, every examination and every small symptom become something that has to be planned carefully.”
(P15)

Fragmentation of the care pathway following diagnosis represented one of the more prominent concerns. Confidence in the clinical competence of vascular specialists was widely expressed, but this positive assessment sometimes coexisted with difficulties related to coordination and continuity. In several accounts, diagnostic investigations, specialist consultations, follow-up examinations, and laboratory testing were experienced as separate components that participants themselves had to organize and connect. These participants described assuming responsibility for remembering appointments, monitoring deadlines, arranging transportation, and ensuring that relevant clinical information was available at consultations. As one participant explained:

“The specialists are competent, but organizing everything is left to me. I have to remember appointments, book examinations, arrange transportation and make sure I don’t miss anything. Sometimes it feels as if I am coordinating my own healthcare.” (P10)

Related narratives indicated that the burden of coordinating care could become an additional source of psychological distress, although this experience was not equally prominent in all participants’ accounts.

Barriers involving geographical distance, waiting times, and healthcare expenditure appeared in different combinations according to participants’ circumstances. For those living farther from specialist vascular services, travel could require assistance from relatives, access to private transportation, or the use of paid transport, with these difficulties becoming particularly relevant among participants who did not drive or no longer felt confident doing so. Concerns about waiting times were also recurrent, especially when

delays involved diagnostic investigations or specialist consultations. Some participants interpreted prolonged waits as a source of uncertainty about possible disease progression, while others reported turning to private consultations or investigations when they considered the delay unacceptable, despite the associated financial burden. One participant emphasized the practical impact of geographical distance:

“Healthcare services are far away. For every specialist visit I have to travel at least 20 or 30 km, and without my own car it becomes complicated. Sometimes the journey itself is more stressful than the visit.” (P02)

These experiences varied in intensity but demonstrated that formal availability of healthcare services did not necessarily translate into equally straightforward access for all participants.

Participants’ assessments of healthcare quality also incorporated relational aspects of care. Trust in vascular specialists and recognition of their clinical expertise were common features of the narratives. However, within this generally positive assessment, a number of participants described consultations in which limited time or highly technical communication left insufficient opportunity to discuss uncertainties and everyday concerns associated with living with CAS. For these participants, receiving appropriate medical treatment did not always correspond to feeling fully informed or listened to as an individual. As one participant reflected:

“The doctors were always professional, but sometimes I left the consultation with many doubts because there wasn’t enough time to ask questions. I would have liked someone to explain things more calmly, not only what the examination showed but also how to live with this disease.” (P14)

Other accounts provided a more positive counterpoint, emphasizing that consultations were particularly reassuring when clinicians dedicated sufficient time to answering questions, clarifying uncertainties, and acknowledging the emotional consequences of the diagnosis. Thus, participants’ evaluations of care reflected both confidence in professional competence and variation in experiences of communication and interpersonal support.

Informational and organizational needs constituted another recurring element, although the type and intensity of support desired differed between participants. Some expressed a need for practical guidance extending beyond pharmacological treatment, particularly regarding nutrition, physical activity, recognition of warning signs, and long-term self-management of CAS. In other accounts, the emphasis was placed on practical forms of assistance, such as patient navigation, transportation support, or opportunities for peer support. These perspectives broadened participants’ descriptions of high-quality care beyond clinical expertise alone, encompassing continuity, accessible communication, organizational support, and attention to the practical circumstances affecting everyday disease management.

3.6. Education Access and Quality: Health Literacy as a Foundation for Engagement and Self-Management

Participants generally understood educational experiences in terms broader than formal schooling, emphasizing the ability to acquire, interpret, and apply health-related information throughout the illness trajectory. The importance of understanding CAS, its associated risks, and the rationale underlying medical recommendations was evident in a substantial range of accounts, particularly in relation to participants’ ability to feel actively involved in their care. Health literacy therefore emerged as a central dimension of the educational domain, although participants differed in their confidence, informational needs,

and ability to use health-related knowledge in decision-making, treatment adherence, and long-term self-management.

Difficulty understanding information provided around the time of diagnosis was a recurrent experience, particularly in accounts describing the initial communication of CAS. Participants who encountered such difficulties recalled fear and confusion that sometimes limited their ability to absorb medical explanations during the consultation. Clinicians were generally portrayed as competent and supportive; nevertheless, a number of participants described challenges related to technical terminology or insufficient opportunities to clarify doubts. Some reported leaving appointments with unanswered questions and subsequently turning to family members, printed educational materials, or online resources to develop a clearer understanding of their condition. As one interviewee recalled:

"When they told me I had carotid stenosis, I was frightened, but I didn't really understand what it meant. I nodded during the consultation, but once I got home, I realized I still had many questions." (P30)

For these participants, comprehension developed progressively rather than being achieved during a single clinical encounter, as information was revisited and supplemented through additional sources.

Not all participants experienced information-seeking and involvement in decision-making in the same way. One group of narratives reflected greater confidence in asking questions, identifying additional sources of information, and discussing treatment with healthcare professionals. These participants described knowledge acquisition as increasing their involvement in treatment decisions and their perceived capacity to implement lifestyle modifications. One patient described actively seeking additional information:

"I started reading reliable websites and asking my doctor more questions every time I had an appointment. The more I understood, the less frightened I became." (P07)

Other accounts reflected greater uncertainty in interpreting medical advice, including concern about misunderstanding recommendations or making inappropriate decisions. The contrast between these experiences highlighted differences in participants' confidence and informational resources while also drawing attention to the role of accessible communication and educational support in facilitating meaningful participation in care.

The desire for practical guidance represented another prominent dimension of the educational accounts. For participants expressing this need, factual information about CAS alone was considered insufficient; they also wanted guidance concerning nutrition, physical activity, medication adherence, recognition of warning symptoms, and strategies for reducing vascular risk. These needs were closely connected to the practical challenge of incorporating clinical recommendations into everyday routines. As one interviewee explained:

"Nobody really tells you how to live with this disease every day. They prescribe medications, but I would also like practical advice about what I should eat, how much I should walk and what I should pay attention to." (P20)

Suggestions for improving educational support varied, but included structured educational programmes, written materials using plain language, and opportunities to revisit information during follow-up appointments. Such suggestions were particularly evident among participants who felt that information received during routine consultations did not fully address the practical demands of living with the disease.

The psychological value attributed to knowledge was also evident in a range of narratives. Participants who described developing a clearer understanding of CAS often associated this process with reduced uncertainty, less fear concerning stroke risk, and a stronger sense of personal control. One patient reflected on this experience:

“Once I understood what carotid stenosis really was and what I could do to reduce the risk, I felt calmer. Knowing more didn’t remove the disease, but it made me feel that I could do something about it.” (P22)

By contrast, accounts characterized by more limited understanding tended to emphasize anxiety and greater reliance on healthcare professionals for interpretation and decision-making. These differing experiences showed that health literacy was relevant to participants in multiple ways: for some, it supported greater confidence and active engagement, whereas for others, difficulties obtaining or interpreting accessible information remained an important source of uncertainty in living with CAS.

3.7. Social and Community Context: Social Relationships as an Invisible Infrastructure of Care

Social relationships occupied a prominent place in participants’ accounts of living with CAS, with family relationships, social networks, and community ties described as relevant throughout the illness trajectory. For a broad range of participants, these relationships extended beyond emotional comfort and provided practical resources that supported access to healthcare, adherence to treatment recommendations, coping with uncertainty, and maintenance of everyday independence. The importance attributed to these forms of support nevertheless varied according to participants’ personal circumstances and the availability of family and wider social networks. Social support therefore emerged as an important dimension of participants’ capacity to manage the disease, while differences in the accessibility and nature of such support contributed to diverse experiences of living with CAS.

The practical role of family members was particularly prominent in participants’ narratives. Spouses, children, and close relatives were described in numerous accounts as assisting with medical appointments, transportation to specialist consultations, medication management, and other practical aspects of care. Such assistance appeared especially important in narratives involving older participants, reduced mobility, or difficulties reaching vascular surgery services. For participants facing these circumstances, family involvement could become an integral component of continuity of care rather than simply an additional source of assistance. As one patient explained:

“Without my wife and my children, I honestly don’t know how I would have managed everything. They take me to the hospital, remind me about my medications and accompany me to almost every appointment. They have become part of my treatment.” (P26)

These accounts illustrated how informal caregiving networks could help participants address practical and logistical difficulties associated with healthcare. However, the degree of reliance on family members was not uniform and depended on both individual needs and the availability of relatives able to provide such support.

Family support also had an emotional dimension that was more complex than its practical benefits alone. Among participants who discussed this aspect of their relationships, concern about the effects of the diagnosis on spouses or adult children was recurrent. Some described attempting to minimize their fears in order to protect relatives from additional distress, whereas others expressed discomfort or guilt about becoming increasingly dependent on family members. One patient described this emotional tension:

“The hardest thing isn’t the disease itself. It’s feeling that your family worries about you all the time. Sometimes I keep my fears to myself because I don’t want to become another burden for them.” (P03)

These experiences provided a counterpoint to accounts emphasizing the protective role of family support. For some participants, therefore, close relationships simultaneously

provided reassurance and practical assistance while generating concerns about dependency, reciprocity, and the emotional burden placed on relatives.

Support extending beyond the immediate family represented another dimension of participants' experiences, although its availability and perceived importance differed more noticeably. Participants who described supportive relationships with friends, neighbors, or members of their local communities often associated these connections with reassurance and reduced feelings of isolation. Informal conversations with individuals who had experienced similar vascular conditions were particularly valued in some narratives because they offered opportunities to normalize the illness experience and envisage life beyond the diagnosis. As one interviewee reflected:

"Talking to people who had already experienced something similar helped me much more than I expected. It made me realise that life does not end with this diagnosis and that many people continue living normally." (P18)

Other participants described less extensive social resources. Accounts characterized by limited social networks or living alone placed greater emphasis on loneliness, uncertainty, and reduced confidence in managing the condition, particularly during the period immediately following diagnosis. The contrast between these experiences showed that the potential benefits of community and informal social support depended substantially on whether such relationships were available to the individual.

A further, less uniformly expressed concern involved the extent to which participants felt that their condition was understood by others. Some participants described CAS as largely invisible within their social environment because it did not necessarily produce an overt physical disability. In these accounts, friends, employers, or relatives could underestimate the psychological impact associated with living with the perceived threat of stroke. One patient captured this experience clearly:

"People tell you that you look fine because they don't see anything from the outside. They don't understand that every day you live with the fear that something could suddenly happen." (P27)

For participants reporting this lack of recognition, the discrepancy between outward appearance and internal concerns could contribute to frustration or feelings of social isolation. Although this perspective was not expressed with the same prominence across all narratives, it identified a distinct dimension of the social experience of CAS related to feeling understood and socially recognized.

Participants' accounts showed that the social and community context operated through different forms and levels of support. Family involvement represented a particularly prominent source of practical and emotional assistance, while broader networks involving friends, neighbors, and communities were more variable in their availability and significance. At the same time, some narratives revealed the emotional complexity of relying on relatives, the vulnerability associated with limited social networks, and the experience of having an externally invisible condition that was not always understood by others. These differences illustrate how the availability, nature, and perceived quality of social relationships contributed to participants' differing capacities to navigate healthcare, manage everyday demands, and adapt psychologically to living with CAS.

3.8. Relative Prominence of Determinants

Although the qualitative design was not intended to rank the five SDH domains according to effect size, participants' accounts suggested that some determinants were particularly prominent in shaping the experience of CAS. Healthcare access and quality and economic stability emerged as major structural influences because they directly affected

participants' ability to obtain timely examinations and specialist care, manage transportation and healthcare costs, and sustain recommended treatment and lifestyle modifications. Social and community context also represented an important cross-cutting dimension, particularly through family support, which frequently helped participants overcome practical and organizational barriers to care. Education and health literacy influenced participants' understanding of CAS and their capacity to engage in self-management, while neighborhood and environmental conditions affected opportunities to adopt recommended healthy behaviors. Rather than identifying a single determinant operating independently, the findings therefore indicated that participants' experiences were shaped by the interaction of multiple SDHs, with economic resources, healthcare accessibility, and social support appearing particularly salient across the care trajectory.

4. Discussion

The present study provides a qualitative exploration of how individuals living with CAS perceive and experience the influence of SDHs across their illness trajectory. While previous research has predominantly examined associations between individual SDHs and vascular outcomes using epidemiological or administrative data [23], our findings indicate that patients experience these determinants not as discrete risk factors but as interconnected dimensions that shape diagnosis, access to care, treatment adherence, lifestyle modification, and long-term adaptation to the disease. The five domains of the CDC framework interacted dynamically throughout participants' narratives, suggesting that the lived experience of CAS is embedded within broader social, economic, and environmental contexts [18–21].

These interactions emerged across multiple aspects of participants' illness trajectories. Economic resources influenced not only material conditions but also access to healthcare and the capacity to adopt recommended lifestyle changes, while educational experiences shaped participants' understanding of CAS and their engagement with clinical decision-making. Neighborhood characteristics affected mobility and access to specialized vascular services, whereas social and family relationships frequently mitigated, or in some cases amplified, the challenges associated with disease management. Collectively, these accounts illustrate how economic, educational, healthcare, environmental, and social circumstances may intersect and reinforce one another, influencing how CAS is understood, how healthcare is accessed, how treatment decisions are negotiated, and how long-term management is sustained. The five CDC domains therefore provided analytically distinct perspectives while also capturing the interconnected social context within which participants experienced and managed CAS [18–21].

Our findings extend previous evidence showing that economic stability, healthcare accessibility, educational opportunities, neighborhood environments, and social relationships influence vascular prevention and outcomes [30]. While this literature has largely documented associations between SDHs and vascular outcomes, the present findings illustrate how these determinants are experienced in everyday life. Participants' narratives showed how structural conditions influenced the practical, emotional, and organizational dimensions of living with CAS, including access to care, disease management, and adaptation to illness. Thus, our qualitative findings complement existing epidemiological evidence by showing that the influence of SDHs extends beyond disparities in clinical outcomes to the everyday experience of disease management [27].

Perhaps the most important contribution of this study lies in showing that participants did not describe CAS simply as a vascular disorder requiring pharmacological treatment or surgical intervention. Instead, they portrayed it as a chronic condition whose successful management depended upon resources extending well beyond the healthcare system itself [31]. This finding is consistent with quantitative evidence from other noncommu-

nicable diseases showing that financial resources, healthcare accessibility, health literacy, neighborhood conditions, and social support are associated with disease management and clinical outcomes. In a large cardiovascular cohort, Cai et al. showed that a greater cumulative burden of unfavorable SDHs was associated with increased risks of major adverse cardiovascular events and all-cause mortality [32]. Quantitative studies in other chronic diseases similarly support the importance of the determinants identified in our participants' narratives. Wang et al. demonstrated significant associations between health literacy, social support, and health-related quality of life among patients with hypertension [33], while Zhang et al. showed that health literacy mediated the relationship between social support and healthy lifestyles in patients with chronic diseases [34]. In patients with diabetes, White et al. similarly identified associations between health literacy, social support, and disease-related outcomes [35]. These observations parallel our findings that financial security influenced access to specialist care and healthier lifestyles, health literacy shaped participants' confidence in understanding and implementing medical advice, and family and community networks helped patients manage practical and organizational demands. However, the present findings also highlight aspects that may be particularly salient in CAS. Wu et al., using quantitative data from patients undergoing carotid revascularization, showed that greater neighborhood social disadvantage was associated with more severe disease at presentation and poorer postoperative outcomes [31]. Our qualitative findings provide an experiential counterpart to these associations by showing how geographical accessibility, transportation, financial resources, healthcare organization, and social support are encountered and negotiated by patients living with CAS. Thus, while many of the social influences identified here are shared across chronic noncommunicable diseases, their interaction with access to specialized vascular care and the perceived threat of cerebrovascular events may acquire particular significance in CAS. These findings reinforce recent calls to integrate systematic assessment of SDHs into routine vascular practice [36].

One important clinical implication emerging from these findings relates to the contemporary management of CAS itself. Over the last two decades, advances in intensive best medical therapy have substantially reduced the risk of ipsilateral stroke among patients with ACS, leading current international guidelines to recommend aggressive control of vascular risk factors as the cornerstone of management for the majority of patients, while reserving carotid endarterectomy or carotid artery stenting for carefully selected individuals at higher risk of stroke [37–40]. In this context, the effectiveness of treatment depends not only on the appropriate prescription of antiplatelet agents, high-intensity lipid-lowering therapy, antihypertensive medications, glycaemic control, smoking cessation, regular physical activity, and adherence to a Mediterranean-style diet, but also on patients' sustained ability to implement these interventions over many years [41–44]. Our findings suggest that SDHs directly influence this therapeutic pathway. Financial constraints limited participants' ability to purchase healthier foods, travel to follow-up appointments, or access timely specialist evaluations; limited health literacy affected understanding of the rationale for preventive therapies and long-term adherence; fragmented healthcare pathways complicated surveillance and continuity of care; and unfavorable neighborhood environments reduced opportunities for regular physical activity [23,31].

Importantly, these barriers do not simply affect quality of life but may also influence the biological progression of systemic atherosclerosis by compromising control of modifiable vascular risk factors. Conversely, participants with greater social support, stable economic resources, and better access to healthcare described greater confidence in maintaining lifestyle changes and complying with medical recommendations. These observations reinforce the concept that optimal management of CAS should extend beyond procedural decision-making to include systematic identification of social vulnerability

during routine vascular assessment. Integrating brief screening for social determinants; strengthening collaboration between vascular specialists, primary care physicians, dietitians, rehabilitation services, and social workers; and providing individualized educational interventions may improve adherence to the best medical therapy and reduce preventable vascular events [23,24,45].

However, the determinants identified in this study cannot be adequately addressed at the level of individual clinical encounters alone. At the health-system level, our findings concerning financial constraints, transportation difficulties, waiting times, and fragmented pathways point toward interventions designed to reduce practical barriers to treatment and follow-up. Evidence from cardiovascular populations indicates that reducing patients' out-of-pocket expenditure can improve adherence to evidence-based preventive medication; in a randomized trial following myocardial infarction, Choudhry et al. found that eliminating copayments increased adherence and reduced patients' healthcare expenditure, although the primary composite cardiovascular outcome was not significantly reduced [46]. Transportation represents another potentially modifiable access barrier. A systematic review and meta-analysis by Shekelle et al. found that interventions including transportation services, vouchers, and ride-sharing support were associated with fewer missed healthcare appointments, although evidence regarding effects on clinical outcomes and healthcare costs remained limited [47]. Within CAS pathways, comparable health-system responses could include improved coordination between vascular specialists and primary care, facilitated scheduling and follow-up, transportation assistance for patients with mobility or geographical barriers, and mechanisms for identifying and directing economically vulnerable patients toward available financial and social resources. Such interventions would shift the response to social vulnerability from its identification alone toward practical mitigation of barriers affecting continuity of vascular care.

At the community level, participants' accounts similarly suggest that health literacy and social support should not be considered exclusively individual attributes. Community-based education, peer-support initiatives, caregiver involvement, and programs linking healthcare services with local community resources may complement information delivered during specialist consultations. Evidence from health literacy interventions indicates that appropriately designed educational strategies can improve health literacy and, in some studies, health-related behaviors [48], while cardiovascular-specific approaches using tailored counseling, simplified information, self-monitoring, and periodic reminders have been proposed for patients with limited health literacy [49]. Nevertheless, social support interventions should be interpreted cautiously. Although peer and family networks were important resources in our participants' narratives, a review by Purcell et al. found no clear effect of social network or social support interventions on mortality or hospital admission among patients with heart disease, despite possible benefits for some intermediate outcomes [50]. Thus, the present findings support strengthening opportunities for social and educational support while recognizing that the effectiveness of specific community interventions depends on their design, context, and integration with clinical care.

The neighborhood-related experiences described by participants require an even broader response because clinicians and healthcare organizations have limited capacity to modify the physical environments in which patients live. Local and governmental policies influencing walkability, pedestrian safety, access to green spaces, active transportation, and the availability of facilities for physical activity may determine whether recommendations concerning exercise and healthier lifestyles are realistically achievable [51,52]. This interpretation is supported by quantitative intervention research. Systematic reviews of natural experiments and structural interventions have found that modifications to neighborhood environments, including improvements in walking and cycling infrastructure,

parks, accessibility, and active-transportation environments, can increase physical activity, although effects vary according to intervention type and population [53,54]. Such evidence is particularly relevant to our participants who described unsafe roads, inadequate sidewalks, traffic, and limited green spaces as obstacles to implementing recommendations for regular physical activity. From an SDH perspective, advising patients to exercise without considering whether their neighborhood provides safe and accessible opportunities to do so risks locating responsibility entirely at the individual level for behaviors that are partly environmentally constrained [51,52].

These findings therefore support a multilevel approach to SDHs in CAS. At the clinical level, social assessment and tailored communication may help identify patients at risk of difficulty implementing best medical therapy; at the health-system level, improved care coordination, transportation support, and strategies addressing financial barriers may facilitate access and continuity; at the community level, health-literacy initiatives and appropriately designed social-support programs may strengthen patients' capacity to manage a chronic vascular condition; and at the local and governmental levels, policies supporting walkable environments, safe public spaces, active transportation, and equitable access to health-promoting resources may create conditions in which recommended lifestyle changes are more feasible [55,56]. These levels should not be viewed as alternatives but as complementary responses to interconnected determinants. Such an approach is consistent with the broader SDH framework underpinning this study and avoids placing responsibility for the successful management of CAS exclusively on individual patients or clinicians.

From a clinical perspective, these findings support a shift toward a more comprehensive model of vascular care in which social assessment complements traditional vascular risk stratification, enabling clinicians to identify patients who may appear medically suitable for conservative management but whose social circumstances place them at increased risk of poor long-term adherence and, consequently, worse clinical outcomes [23,57,58].

Strengths, Limitations, and Future Research

This study has several strengths. First, it addresses a relatively unexplored dimension of CAS by examining how multiple social determinants are experienced and negotiated by patients across the illness trajectory, rather than considering individual socioeconomic indicators in isolation. The use of the CDC five-domain framework provided a systematic multidimensional structure while allowing participants' narratives to reveal interactions across economic, educational, healthcare, environmental, and social domains. Purposive sampling sought variation across demographic, socioeconomic, and clinical characteristics, including age, sex, educational attainment, employment status, place of residence, clinical presentation, treatment pathway, and time since diagnosis. Methodological rigor was further supported by the use of a single trained interviewer, in-depth semi-structured interviews, verbatim transcription and verification against audio recordings, field notes, repeated engagement with the dataset, independent coding by two researchers, reflexive analytic discussions, and explicit consideration of divergent or less common accounts.

Several limitations should nevertheless be acknowledged. Participants were recruited from two vascular surgery units in Calabria and Campania, and the findings are therefore context-dependent and should not be assumed to represent the experiences of individuals living with CAS in other healthcare systems or geographical settings. Moreover, the sample was predominantly male and older, with most participants being retired. Although this composition is broadly consistent with the demographic profile of CAS, the experiences of women, younger patients, and economically active individuals may consequently be less extensively represented. Recruitment through specialist vascular services may also have favored individuals already engaged with the healthcare system, potentially underpre-

senting people experiencing more substantial barriers to diagnosis, specialist referral, or continuity of care. In addition, the findings reflect participants' perceptions and interpretations of SDHs and cannot establish causal relationships between specific social conditions, treatment adherence, disease progression, or clinical outcomes. The predominantly deductive use of the CDC framework may also have directed analytical attention toward predefined domains, despite its flexible application and the reflexive approach adopted during analysis. Finally, the cross-sectional design captures participants' experiences at a particular stage of their illness trajectory and cannot determine how social circumstances and their perceived influence may change over time.

Future research should extend these findings through multicenter studies involving more geographically, socially, and demographically diverse populations, including greater representation of women, working-age individuals, rural populations, and patients with different clinical presentations and treatment pathways. Longitudinal qualitative studies could examine how SDHs and patients' needs evolve from diagnosis through surveillance, intervention, and long-term management, while mixed-methods research could investigate how the experiences identified here relate to treatment adherence, healthcare utilization, vascular risk-factor control, and clinical outcomes. Finally, intervention studies are needed to determine whether systematic assessment of social vulnerability and targeted strategies addressing health literacy, care coordination, transportation, financial barriers, and social support can improve patient-reported experiences, adherence to best medical therapy, continuity of care, and vascular outcomes.

5. Conclusions

This study shows that living with CAS extends beyond its biological and clinical dimensions and is shaped by multiple, interacting SDHs. Using the CDC five-domain framework, participants' narratives highlighted how economic circumstances, healthcare access, health literacy, neighborhood conditions, and social relationships influence engagement with care, lifestyle modification, and psychological adaptation. These findings suggest that effective management of CAS requires attention not only to appropriate clinical treatment but also to the social and contextual resources that enable patients to manage their condition. Integrating consideration of SDHs into vascular care may support the identification of social vulnerability, strengthen person-centered communication, and improve continuity of care. Future research should evaluate whether interventions addressing SDHs within vascular care pathways can improve patient-reported experiences and clinical outcomes.

Supplementary Materials: The following supporting information can be downloaded at <https://www.mdpi.com/article/10.3390/soc16100328/s1>. Table S1: Sociodemographic and clinical characteristics of the participants (N = 30).

Author Contributions: Conceptualization, D.C. and R.S.; methodology, D.C.; validation, D.C., M.A., V.D., A.I., F.N., G.A., U.M.B., and R.S.; formal analysis, D.C.; investigation, D.C.; data curation, D.C. and R.S.; writing—original draft preparation, D.C., M.A., V.D., A.I., F.N., G.A., U.M.B., and R.S.; writing—review and editing, D.C., M.A., U.M.B., and R.S.; visualization, D.C., M.A., V.D., A.I., F.N., G.A., U.M.B., and R.S.; supervision, D.C. and R.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the Interuniversity Center of Phlebotomology (CIFL) International Research and Educational Program in Clinical and Experimental Biotechnology. Approval number: E.R.ALL.2018.72.A. Approval date: 11 September 2018.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: All data are included in this article.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Dossabhoy, S.; Arya, S. Epidemiology of atherosclerotic carotid artery disease. *Semin. Vasc. Surg.* **2021**, *34*, 3–9. [CrossRef] [PubMed]
2. Rasmussen, T.E.; Rogers, R.T. Carotid artery disease: Epidemiology and socioeconomic burden. In *Carotid Artery Disease*, 1st ed.; Shortell, C.K., Markovic, J.N., Eds.; Academic Press: Cambridge, MA, USA, 2025; pp. 1–9.
3. Verboova, L.; Nedoroscik, A.; Kiskova-Simkova, T.; Smirjakova, A.; Bohus, P.; Kollar, M.; Virag, M.; Mazarova, K.; Zavacka, M. Atherosclerosis: A Pathologist's Perspective. *J. Cardiovasc. Dev. Dis.* **2026**, *13*, 85. [CrossRef] [PubMed]
4. Petrovic, D.J. Redefining the exact roles and importance of carotid intima-media thickness and carotid plaque thickness in predicting cardiovascular events. *Vascular* **2025**, *33*, 1200–1207. [CrossRef] [PubMed]
5. Song, P.; Fang, Z.; Wang, H.; Cai, Y.; Rahimi, K.; Zhu, Y.; Fowkes, F.G.R.; Fowkes, F.J.L.; Rudan, I. Global and regional prevalence, burden, and risk factors for carotid atherosclerosis: A systematic review, meta-analysis, and modelling study. *Lancet Glob. Health* **2020**, *8*, e721–e729. [CrossRef] [PubMed]
6. Costanzo, L.; Failla, G.; Aluigi, L.; Baroncelli, T.A.; Bua, C.; De Marchi, S.; Diaco, E.; Di Paola, F.; Di Pino, F.L.; Mannello, F.; et al. Operative procedures for ultrasound assessment of extracranial artery disease: A narrative review by the Italian society for vascular investigation (SIDV). *J. Clin. Med.* **2025**, *14*, 7050. [CrossRef] [PubMed]
7. Shan, S.; Wu, J.; Zhou, J.; Zhou, L.; Xu, M.; Zhu, L.; Rudan, I.; Song, P.; Global Health Epidemiology Research Group (GHERG). National, regional and provincial prevalence of carotid atherosclerosis and carotid plaque in Chinese adults: An updated systematic review and modelling analysis. *J. Glob. Health* **2026**, *16*, 04089. [CrossRef] [PubMed]
8. de Weerd, M.; Greving, J.P.; Hedblad, B.; Lorenz, M.W.; Mathiesen, E.B.; O'Leary, D.H.; Rosvall, M.; Sitzler, M.; Buskens, E.; Bots, M.L. Prevalence of asymptomatic carotid artery stenosis in the general population: An individual participant data meta-analysis. *Stroke* **2010**, *41*, 1294–1297. [PubMed]
9. Poorthuis, M.H.F.; Solomon, Y.; Herings, R.A.R.; Visseren, F.L.J.; Kappelle, L.J.; Bots, M.L.; Rissanen, I.; de Borst, G.J. Temporal trends and determinants of stroke risk in patients with medically treated asymptomatic carotid stenosis. *Stroke* **2023**, *54*, 1735–1749. [CrossRef] [PubMed]
10. Pedretti, R.F.; Van Craenenbroeck, E.M.; Vrints, C.; Ambrosetti, M.; Kurpas, D.; Vassiliou, V.S.; Bäck, M.; Moholdt, T.; Sionis, A.; Wilhelm, M.; et al. Optimal lifelong roadmap post-acute coronary syndrome: A clinical consensus statement of the European Association of Preventive Cardiology of the European Society of Cardiology. *Eur. J. Prev. Cardiol.* **2026**, *33*, 1913–1939. [PubMed]
11. Dores, H.; Ferreira Santos, J.; Gil, V.; Gonçalves, P.d.A. Cardiovascular prevention: Current gaps and future directions. *Diagnostics* **2026**, *16*, 16. [CrossRef] [PubMed]
12. Chang, X.; Zhu, H.; Guo, Z.; Shi, H.; Tian, Y.; Hao, Q.; Zhang, H.; Zou, R.; Fan, X.; Zhang, Q.; et al. Expert consensus on the diagnosis and management of carotid atherosclerotic plaque: Pathophysiology, clinical management, and preventive approaches. *Int. J. Med. Sci.* **2025**, *22*, 2738–2756. [CrossRef] [PubMed]
13. Hossain, B.; Pinker, I.; Sall, F.; Dessenne, C.; Ruiz-Castell, M. Mapping the evidence on the intersection of gender and social determinants of health in health inequality: A scoping review. *BMC Public Health* **2025**, *25*, 4260. [CrossRef] [PubMed]
14. Kangas, T.; Milis, S.L.; Vanthomme, K.; Vandenheede, H. The social determinants of health-related quality of life among people with chronic disease: A systematic literature review. *Qual. Life Res.* **2025**, *34*, 2501–2511. [CrossRef] [PubMed]
15. Williams, G.H. The determinants of health: Structure, context and agency. *Sociol. Health Illn.* **2003**, *25*, 131–154. [CrossRef]
16. Dahlgren, G.; Whitehead, M. The Dahlgren-Whitehead model of health determinants: 30 years on and still chasing rainbows. *Public Health* **2021**, *199*, 20–24. [CrossRef] [PubMed]
17. Osmick, M.J.; Wilson, M. Social determinants of health-relevant history, a call to action, an organization's transformational story, and what can employers do? *Am. J. Health Promot.* **2020**, *34*, 219–224. [CrossRef] [PubMed]
18. Centers for Disease Control and Prevention. Social Determinants of Health. Available online: <https://www.cdc.gov/public-health-gateway/php/about/social-determinants-of-health.html> (accessed on 13 July 2026).
19. Hacker, K.A.; Alleyne, E.O.; Plescia, M. Public Health Approaches to Social Determinants of Health: Getting Further Faster. *J. Public Health Manag. Pract.* **2021**, *27*, 526–528. [CrossRef] [PubMed]
20. Al-Habbal, K.; Yousef, S.; Kaddoura, R.; Hassan, Z.; El Zein, O. Promoting healthy ageing through measures addressing social determinants of older adults' health: A scoping review protocol. *BMJ Open* **2025**, *15*, e091079. [CrossRef] [PubMed]
21. Mercado, C.I.; Bullard, K.M.; Bolduc, M.L.F.; Andrews, C.A.; Freggens, Z.R.F.; Liggett, G.; Banks, D.; Johnson, S.B.; Penman-Aguilar, A.; Njai, R. A Shift in Approach to Addressing Public Health Inequities and the Effect of Societal Structural and Systemic Drivers on Social Determinants of Health. *Public Health Rep.* **2023**, *11*, 333549241283586.

22. Chaturvedi, A.; Zhu, A.; Gadela, N.V.; Prabhakaran, D.; Jafar, T.H. Social determinants of health and disparities in hypertension and cardiovascular diseases. *Hypertension* **2024**, *81*, 387–399. [\[CrossRef\]](#) [\[PubMed\]](#)
23. Costa, D.; Ielapi, N.; Bevacqua, E.; Ciranni, S.; Cristodoro, L.; Torcia, G.; Serra, R. Social determinants of health and vascular diseases: A systematic review and call for action. *Soc. Sci.* **2023**, *12*, 214. [\[CrossRef\]](#)
24. Scalise, E.; Costa, D.; Gallelli, G.; Ielapi, N.; Turchino, D.; Accarino, G.; Faga, T.; Michael, A.; Bracale, U.M.; Andreucci, M.; et al. Biomarkers and social determinants in atherosclerotic arterial diseases: A scoping review. *Ann. Vasc. Surg.* **2025**, *113*, 41–63. [\[CrossRef\]](#) [\[PubMed\]](#)
25. Tong, T.; Maheswaran, R.; Michaels, J.; Brindley, P.; Walters, S.; Nawaz, S. Socioeconomic disparities in surgery for carotid artery disease in England. *BJS Open* **2023**, *7*, zrad056. [\[CrossRef\]](#) [\[PubMed\]](#)
26. Paraskevas, K.I.; Mikhailidis, D.P.; Baradaran, H.; Davies, A.H.; Eckstein, H.H.; Faggioli, G.; Fernandes, J.F.E.; Gupta, A.; Jezovnik, M.K.; Kakkos, S.K.; et al. Management of patients with asymptomatic carotid stenosis may need to be individualized: A multidisciplinary call for action. *J. Stroke* **2021**, *23*, 202–212. [\[CrossRef\]](#) [\[PubMed\]](#)
27. Costa, D.; Ielapi, N.; Marino, P.; Minici, R.; Accarino, G.; Michael, A.; Faga, T.; Bracale, U.M.; Andreucci, M.; Serra, R. A qualitative study on the role of social determinants of health in patients with peripheral artery disease. *Societies* **2025**, *15*, 87. [\[CrossRef\]](#)
28. Braun, V.; Clarke, V. Conceptual and design thinking for thematic analysis. *Qual. Psychol.* **2022**, *9*, 3–26. [\[CrossRef\]](#)
29. Braun, V.; Clarke, V. Reporting guidelines for qualitative research: A values-based approach. *Qual. Res. Psychol.* **2025**, *22*, 399–438. [\[CrossRef\]](#)
30. Powell-Wiley, T.M.; Baumer, Y.; Baah, F.O.; Baez, A.S.; Farmer, N.; Mahlobo, C.T.; Pita, M.A.; Potharaju, K.A.; Tamura, K.; Wallen, G.R. Social determinants of cardiovascular disease. *Circ. Res.* **2022**, *130*, 782–799. [\[CrossRef\]](#) [\[PubMed\]](#)
31. Wu, W.W.; Mota, L.; Marcaccio, C.; Liang, P.; Moreira, C.C.; Hughes, K.; Schermerhorn, M.L. Impact of neighborhood social disadvantage on carotid artery disease presentation, management, and discharge outcomes. *J. Vasc. Surg.* **2023**, *77*, 1700–1709. [\[CrossRef\]](#) [\[PubMed\]](#)
32. Cai, A.; Chen, C.; Wang, J.; Ou, Y.; Nie, Z.; Feng, Y. Social Determinants of Health, Cardiovascular Health, and Outcomes in Community-Dwelling Adults Without Cardiovascular Disease. *JACC Asia* **2023**, *4*, 44–54. [\[CrossRef\]](#) [\[PubMed\]](#)
33. Wang, Y.; Chen, T.; Gan, W.; Yin, J.; Song, L.; Qi, H.; Zhang, Q. Association among high blood pressure health literacy, social support and health-related quality of life among a community population with hypertension: A community-based cross-sectional study in China. *BMJ Open* **2022**, *12*, e057495. [\[CrossRef\]](#) [\[PubMed\]](#)
34. Zhang, X.; Li, C.; Liu, M.; Sun, J.; Yue, H.; Bao, H. The mediation effect of health literacy on social support and health lifestyle of patients with chronic diseases. *Appl. Nurs. Res.* **2024**, *75*, 151763. [\[CrossRef\]](#) [\[PubMed\]](#)
35. White, A.; Buschur, E.; Harris, C.; Pennell, M.L.; Soliman, A.; Wyne, K.; Dungan, K.M. Influence of Literacy, Self-Efficacy, and Social Support on Diabetes-Related Outcomes Following Hospital Discharge. *Diabetes Metab. Syndr. Obes.* **2022**, *15*, 2323–2334. [\[CrossRef\]](#) [\[PubMed\]](#)
36. Alnaeem, M.M.; Yousef, K.M.; Obeid, A. Sociodemographic predictors of quality of life and cognitive status among patients with carotid artery stenosis: A prospective cohort study. *J. Clin. Neurosci.* **2025**, *136*, 111219. [\[CrossRef\]](#) [\[PubMed\]](#)
37. Spence, J.D.; Song, H.; Cheng, G. Appropriate management of asymptomatic carotid stenosis. *Stroke Vasc. Neurol.* **2016**, *1*, 64–71. [\[CrossRef\]](#) [\[PubMed\]](#)
38. Abbott, A.L.; Brunser, A.M.; Giannoukas, A.; Harbaugh, R.E.; Kleinig, T.; Lattanzi, S.; Poppert, H.; Rundek, T.; Shahidi, S.; Silvestrini, M.; et al. Misconceptions regarding the adequacy of best medical intervention alone for asymptomatic carotid stenosis. *J. Vasc. Surg.* **2020**, *71*, 257–269. [\[CrossRef\]](#) [\[PubMed\]](#)
39. Tenet, M.; Krishnasastri, K.V.; Manvar-Singh, P. Best medical therapy for asymptomatic carotid stenosis: Imminent or ineffective? *Ann. Vasc. Surg.* **2025**, *113*, 294–297. [\[CrossRef\]](#) [\[PubMed\]](#)
40. Brott, T.G.; Howard, G.; Lal, B.K.; Voeks, J.H.; Turan, T.N.; Roubin, G.S.; Lazar, R.M.; Brown, R.D., Jr.; Huston, J., III; Edwards, L.J.; et al. Medical management and revascularization for asymptomatic carotid stenosis. *N. Engl. J. Med.* **2026**, *394*, 219–231. [\[CrossRef\]](#) [\[PubMed\]](#)
41. Ali, A.; Cheema, W.A.; Nisar, F.; Shamoan, M.; Sarfaraz, S.; Butt, A.; Ali, M.A.; Abdullah, A.; Shabbir, M.A.; Talha, M.; et al. Modern management of asymptomatic carotid stenosis: A meta-analysis of CREST-2, SPACE-2, and ECST-2. *Ann. Clin. Transl. Neurol.* **2026**, *13*, 70479. [\[CrossRef\]](#) [\[PubMed\]](#)
42. Gao, Y.; Wang, L.; Zhang, H.; Zhang, X.; Zhang, Y.; Wang, C.; Shen, H.; Xing, P.; Li, Z.; Zhang, Y.; et al. Medical management and revascularization for asymptomatic carotid stenosis: A meta-analysis of randomized controlled trials. *J. Neurol.* **2026**, *273*, 220. [\[CrossRef\]](#) [\[PubMed\]](#)
43. Almevall, A.D.; Wennberg, P.; Liv, P.; Nyman, E.; Lindvall, K.; Norberg, M.; Chorell, E.; Wennberg, M. Midlife Mediterranean diet is associated with subclinical carotid atherosclerosis in late midlife. *Eur. J. Prev. Cardiol.* **2025**, *32*, 1614–1628. [\[CrossRef\]](#) [\[PubMed\]](#)
44. Zupo, R.; Castellana, F.; Lisco, G.; Corbo, F.; Crupi, P.; Sardone, R.; Catino, F.; Perna, S.; Gesualdo, L.; Lozupone, M.; et al. The effect of a Mediterranean diet on arterial stiffness: A systematic review. *Nutrients* **2025**, *17*, 1192. [\[CrossRef\]](#) [\[PubMed\]](#)

45. Brandt, E.J.; Tobb, K.; Cambron, J.C.; Ferdinand, K.; Douglass, P.; Nguyen, P.K.; Vijayaraghavan, K.; Islam, S.; Thamman, R.; Rahman, S.; et al. Assessing and addressing social determinants of cardiovascular health: JACC state-of-the-art review. *J. Am. Coll. Cardiol.* **2023**, *81*, 1368–1385. [\[PubMed\]](#)
46. Choudhry, N.K.; Avorn, J.; Glynn, R.J.; Antman, E.M.; Schneeweiss, S.; Toscano, M.; Reisman, L.; Fernandes, J.; Spettell, C.; Lee, J.L.; et al. Post-Myocardial Infarction Free Rx Event and Economic Evaluation (MI FREEE) Trial. Full coverage for preventive medications after myocardial infarction. *N. Engl. J. Med.* **2011**, *365*, 2088–2097. [\[PubMed\]](#)
47. Shekelle, P.G.; Begashaw, M.M.; Mlake-Lye, I.M.; Booth, M.; Myers, B.; Renda, A. Effect of interventions for non-emergent medical transportation: A systematic review and meta-analysis. *BMC Public Health* **2022**, *22*, 799. [\[CrossRef\]](#) [\[PubMed\]](#)
48. Walters, R.; Leslie, S.J.; Polson, R.; Cusack, T.; Gorely, T. Establishing the efficacy of interventions to improve health literacy and health behaviours: A systematic review. *BMC Public Health* **2020**, *20*, 1040. [\[CrossRef\]](#) [\[PubMed\]](#)
49. Lee, T.W.; Lee, S.H.; Kim, H.H.; Kang, S.J. Effective intervention strategies to improve health outcomes for cardiovascular disease patients with low health literacy skills: A systematic review. *Asian Nurs. Res.* **2012**, *6*, 128–136. [\[CrossRef\]](#) [\[PubMed\]](#)
50. Purcell, C.; Dibben, G.; Hilton Boon, M.; Matthews, L.; Palmer, V.J.; Thomson, M.; Smillie, S.; Simpson, S.A.; Taylor, R.S. Social network interventions to support cardiac rehabilitation and secondary prevention in the management of people with heart disease. *Cochrane Database Syst. Rev.* **2023**, *6*, CD013820. [\[CrossRef\]](#) [\[PubMed\]](#)
51. Hinckson, E.; Reis, R.; Romanello, M.; Ding, D.; Adelekan, I.; Favarão Leão, A.L.; Ballard, E.; Benmarhnia, T.; Hogg, R.; Sallis, J.F.; et al. Benefit of physical activity initiatives for climate change mitigation and adaptation. *Nat. Health* **2026**, *1*, 300–315. [\[CrossRef\]](#)
52. Lu, Y.; Reichert, M.; Guerry, A.D.; Yuan, Q.; Li, Y.; Rydstrom, A.; Wu, T.; Reinhard, I.; Rehder, J.; King, A.C.; et al. Wearable data link urban green space to physical activity. *Nat. Health* **2026**, *1*, 67–77. [\[CrossRef\]](#)
53. Kärmeniemi, M.; Lankila, T.; Ikäheimo, T.; Koivumaa-Honkanen, H.; Korpelainen, R. The Built Environment as a Determinant of Physical Activity: A Systematic Review of Longitudinal Studies and Natural Experiments. *Ann. Behav. Med.* **2018**, *52*, 239–251. [\[CrossRef\]](#) [\[PubMed\]](#)
54. Zhang, Y.; Koene, M.; Reijneveld, S.A.; Tuinstra, J.; Broekhuis, M.; van der Spek, S.; Wagenaar, C. The impact of interventions in the built environment on physical activity levels: A systematic umbrella review. *Int. J. Behav. Nutr. Phys. Act.* **2022**, *19*, 156. [\[CrossRef\]](#) [\[PubMed\]](#)
55. Sharkiya, S.H. Quality communication can improve patient-centred health outcomes among older patients: A rapid review. *BMC Health Serv. Res.* **2023**, *23*, 886. [\[CrossRef\]](#) [\[PubMed\]](#)
56. Tanti, R.; Cunningham, R.; Fisher, P. Understanding patients' perspectives of clinical communication within a Major Trauma Centre. *Injury* **2024**, *55*, 111563. [\[CrossRef\]](#) [\[PubMed\]](#)
57. Perone, F.; Bernardi, M.; Spadafora, L.; Betti, M.; Cacciatore, S.; Saia, F.; Fogacci, F.; Jaiswal, V.; Asher, E.; Paneni, F.; et al. Non-traditional cardiovascular risk factors: Tailored assessment and clinical implications. *J. Cardiovasc. Dev. Dis.* **2025**, *12*, 171. [\[CrossRef\]](#) [\[PubMed\]](#)
58. Religioni, U.; Barrios-Rodríguez, R.; Requena, P.; Borowska, M.; Ostrowski, J. Enhancing therapy adherence: Impact on clinical outcomes, healthcare costs, and patient quality of life. *Medicina* **2025**, *61*, 153. [\[CrossRef\]](#) [\[PubMed\]](#)

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.