Emergency care network: stroke care

Rede de atenção às urgências e emergências: atendimento ao acidente vascular cerebral

Red de atención de urgencias y emergencias: asistencia a accidentes cerebrovasculares

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Abstract

Objective: To analyze how the care of patients with acute ischemic stroke occurs, considering the care flows and the restrictive and facilitating elements of care in the emergency care network.

Methods: This is a study based on the Grounded Theory methodological framework. We interviewed 75 health professionals from the Brazilian Mobile Emergency Care Service, Emergency Care Unit and reference hospital in the city of Salvador, Bahia.

Results: A total of 14 categories and 66 subcategories emerged that represented the phenomenon studied, revealing causal factors of network fragmentation such as lack of vacancies and resources, need for improvement in the care protocol, hospital bureaucratization, lack of knowledge by the population, despite the efforts of professionals to meet this patient. Professional interaction revealed the absence of a single language, obstacles in professional relationships, lack of knowledge of the other's role, difficulty in regulating patients and sharing some goals in the network. Consequently, patients left the care line, care for patients outside the therapeutic window, the need to impose a 'zero vacancy', and better care when patients had access to specialized unit. Facilitating elements also concern the sharing of goals in the network and the effort of professionals to attend to window patients.

Conclusion: The network fragmentation reveals the need for management interventions to improve care, standardizing it and making care comprehensive and equitable.

Resumo

Objetivo: Analisar como ocorre o atendimento de pacientes com Acidente Vascular Cerebral isquêmico agudo considerando os fluxos assistenciais e os elementos restritivos e facilitadores do atendimento na Rede de Atenção às Urgências e Emergências.

Métodos: Trata-se de estudo fundamentado no referencial metodológico da *Grounded Theory*. Foram entrevistados 75 profissionais de saúde do Serviço de Atendimento Móvel de Urgência, da Unidade de Pronto Atendimento e do Hospital Referência na cidade de Salvador, Bahia.

Resultados: Emergiram 14 categorias e 66 subcategorias que representaram o fenômeno estudado, revelando fatores causais da fragmentação da rede como falta de vaga e de recursos, necessidade de melhoria no protocolo de atendimento, burocratização hospitalar, desconhecimento da população, apesar dos esforços dos profissionais em atender esse paciente. A interação profissional revelou ausência de linguagem única, entraves nas relações profissionais, desconhecimento do papel do outro, dificuldade em regular o paciente e compartilhamento de alguns objetivos na Rede. Consequentemente houve a saída do paciente da Linha de Cuidado, atendimento dos pacientes fora de janela terapêutica, necessidade de imposição da 'vaga zero', e

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um melhor atendimento quando o paciente teve acesso à unidade especializada. Elementos facilitadores dizem respeito também ao compartilhamento de objetivos na rede e ao esforço dos profissionais para atender o paciente em janela.

Conclusão: A fragmentação da Rede revela necessidade de intervenções gerenciais no sentido de aprimorar o atendimento, padronizando-o e tornando a assistência integral e equânime.

Resumen

Objetivo: Analizar cómo se realiza la asistencia a pacientes con accidente cerebrovascular isquémico agudo considerando los flujos de asistencia y los elementos restrictivos y facilitadores de la atención en la Red de Atención de Urgencias y Emergencias.

Métodos: Se trata de un estudio basado en el marco referencial metodológico de la *Grounded Theory*. Fueron entrevistados 75 profesionales de la salud del Servicio de Atención Móvil de Urgencia, de la Unidad de Pronta Atención y del Hospital Referencia de la ciudad de Salvador, estado de Bahia.

Resultados: Surgieron 14 categorías y 66 subcategorías que representan el fenómeno estudiado y revelan factores causales de la fragmentación de la red, como falta de camas y recursos, necesidades de mejora del protocolo de atención, burocracia hospitalaria, desconocimiento de la población, a pesar de los esfuerzos de los profesionales en atender ese paciente. La interacción profesional reveló ausencia de un lenguaje único, trabas en las relaciones profesionales, desconocimiento del papel del otro, dificultades para regular al paciente e intercambio de algunos objetivos de la red. Consecuentemente, se produjo la salida del paciente de la línea de cuidado, la atención a pacientes fuera de la ventana terapéutica, la necesidad de aplicación de la "cama de reserva" y una mejor atención cuando el paciente tuvo acceso a la unidad especializada. Los elementos facilitadores también se refieren a compartir objetivos en la red y al esfuerzo de los profesionales para atender al paciente en ventana.

Conclusión: La fragmentación de la red revela la necesidad de intervenciones gerenciales en el sentido de mejorar y estandarizar la atención para que sea completa y ecuánime.

Introduction

Stroke is a disabling disease with high morbidity and mortality, which affects more and more young people, being divided into ischemic and hemorrhagic, the former being the most prevalent.[1] It is intrinsically related to comorbidities such as hypertension and diabetes mellitus, which are risk factors on a growth curve in the Brazilian population.[1] Initial care for patients with ischemic stroke needs to be fast and accurate, due to the specificity of a thrombolytic medication that can only be used within just 4.5 hours for patients with ischemic stroke, requiring a high level of coordination between services.[2]

The Emergency Care Network (ECN) has ports, of the most diverse complexities, through which patients can access care. Thus, patients enter the network through the Brazilian Mobile Emergency Care Service (SAMU - *Serviço de Atendimento Móvel de Urgência*) and Emergency Care Unit (ECU), and in some realities there may also be entry directly through hospital emergencies.[3] In this way, the efficiency and effectiveness of assistance offered in any of these health units are imperative.[3] Success is related to the population's level of education, to the network structure and professional interaction,[4] which need to be aligned and articulated in effectively referring patients through services.

Although stroke is an acute disease, when there is no intersectoral collaboration for the effectiveness of care, there are implications related to sequelae for patients and the significant economic impact generated by dependence on the public health system.[5] Thus, it is essential to consider the barriers to access for patients to reach health services.[6]

In addition, there are few studies that assess the connection of services in the network care for these patients, with more frequent studies that internally assess health services, or refer occasionally to a measure that has been used to improve care.

In this way, there is an urgent need to verify how care is provided to this patient, given that there are several technologies and resources already being used so that there is effectiveness in care and success in acute care in a structured network system.[7] Thus, the question is: how is care provided to patients with acute ischemic strokes within the Unifies Health System (SUS – *Sistema Único de Saúde*) emergency network?

Thus, this study aimed to analyze how the care of patients with acute ischemic stroke occurs, considering care flows and restrictive and facilitating elements of care at the ECN in Salvador, Bahia, Brazil.

Methods

This is a study based on the Grounded Theory (GT) methodological framework. GT is characterized as a method of comparative analysis that starts from an empirical investigation to build a theory that favors the understanding of reality from the meanings attributed by those who experience it. [8]

The study was carried out in health units that make up the ECN and that treat patients with acute ischemic stroke, delimiting itself to SAMU, to two ECUs located in different and extreme health districts of the city, and to the referral hospital for stroke in the city of Salvador, Bahia, Brazil.

Data collection was carried out between October 2019 and October 2020.

The study population consisted of professionals, nurses and doctors from the four services.

For the selection of participants in the sample groups, Health professionals from the services that make up the ECN and who assist acute stroke (SAMU, ECU, hospital) or head of these health units were included, in addition to having been working for at least one year in the function. ECU and hospital professionals who reported not feeling comfortable in participating were excluded from the study.

The study participants were constituted by theoretical sampling, which involves the formation of sample groups, initially directed to the research problem,[9] the first sample group (SG) participants were previously defined, and the other groups were unveiled throughout the research process.[8] From the analysis of data obtained with the first sample group (SAMU), participants were included according to theoretical sampling, and the following sample groups were directed according to the hypotheses raised with the data from the previous groups. Thus, the first SG was composed of 31 professionals from SAMU, 17 nurses and 14 doctors; the second group was composed of 24 professionals from two ECU, being 18 nurses and six doctors; and, finally, the third SG was composed of 20 health professionals from the reference hospital, being 12 nurses and eight doctors, totaling 75 health professionals.

Data collection was directed from individual interviews through the research's guiding question, "Tell me about the care of patients with suspected stroke", allowing free expression on the topic. According to participants' responses, new questions were directed in order to elucidate or clarify the points raised by them, in order to obtain an in-depth interview.

The interviews were carried out until theoretical data saturation, with the consolidation and articulation of the categories that make up the substantive theory.

As in GT, data collection and analysis took place concomitantly, and memoranda were prepared after each interview to assist in data analysis. The analysis was performed in three stages: open coding, axial coding and integration[8] applied from the transcript of the interviews. Initially, line-by-line reading was performed, with assignment of substantive codes with characteristics of participants' speeches (open coding). Afterwards, the codes were grouped and concepts were elaborated, delimiting the phenomenon (axial coding). Finally, with the constant comparison of interview data in the development of categories and subcategories, the central category "Revealing the Emergency Care Network fragmentation in the care of patients with acute stroke" was delimited (integration).

Participants were identified by the letter "I" for interview, followed by the institution's initial letter(s): "S" for SAMU, or "ECU" or "H" for hospital, followed by the number ordinal according to the interview sequence, for instance, "IS1", "IECU3", "IH15".

To assist the data organization process, we use NVIVO®. To validate the theoretical model, the validity instrument was sent by email to two health professionals from each of the types of institution that participated in the research and to two specialists in the method, totaling eight professionals.

In order to ensure quality in qualitative research, we have adopted the Consolidated criteria for REporting Qualitative research (COREQ) guidelines.[10]

The development of this study complied with ethical standards in research involving human beings. The research was submitted to the Public Health Institute's Research Ethics Committee, *Universidade Federal da Bahia*, approved under CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 17763719.9.0000.5030 and

Opinion 3,538,900, meeting the ethical requirements of the research according to Resolutions 466/2012[11] and 510/2016[12] of the Brazilian National Health Council. All participants confirmed their acceptance of their participation by signing the Informed Consent Form.

Results

The central category that emerged from the analysis was entitled "Revealing the Emergency Care Network fragmentation in the care of patients with acute stroke", considering the restrictive and disconnected elements for care, pointed out in condition, action-interaction and consequences categories. The integrative diagram below represents articulation between the central category and3 the other categories that make up the paradigm of the phenomenon (Figure 1).

The condition component was represented by five categories and 27 subcategories, as shown in chart 1.

The action-interaction component was represented by five categories and 24 subcategories, according to chart 2.

The consequence component was represented by four categories and 15 subcategories, according to chart 3.

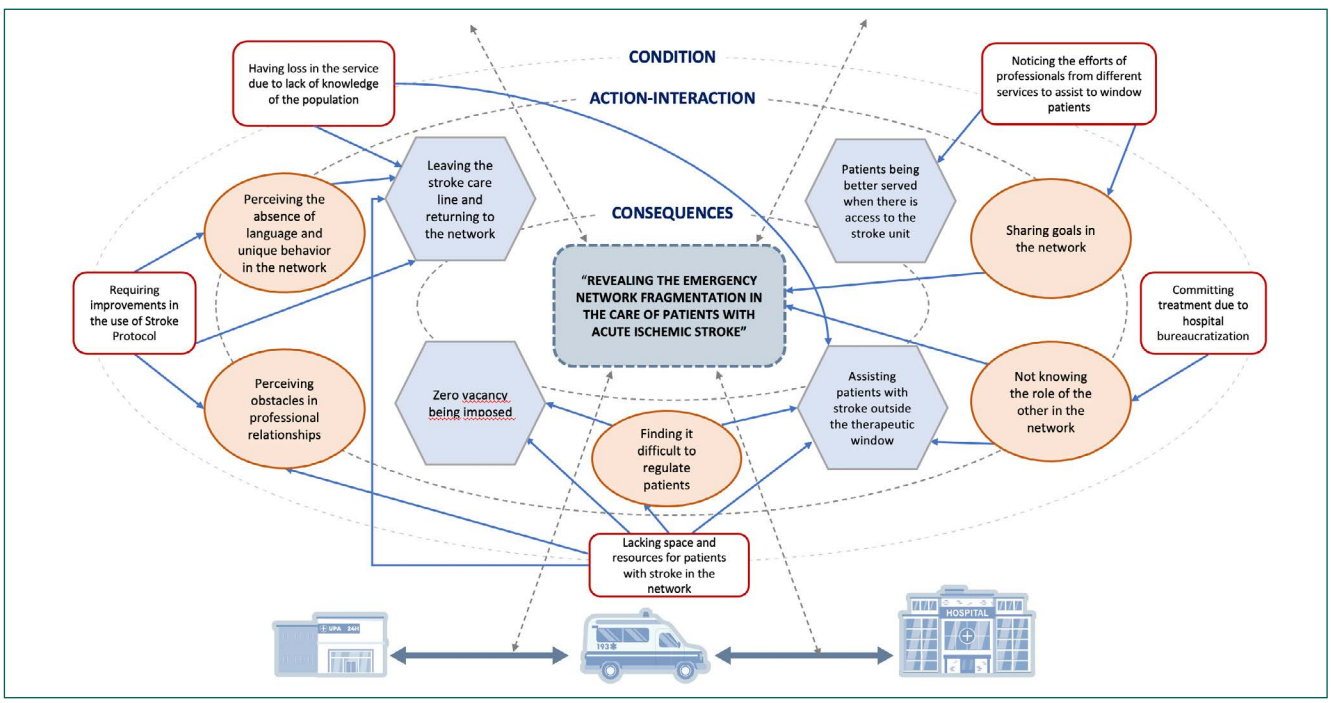

Figure 1. Integrative diagram of the phenomenon

Chart 1. Condition component categories and subcategories

Categories (Condition)	Development of categories and subcategories
Missing vacancy and resources for stroke patient in the network	Subcategories point to the lack of space for adequate care of patients with stroke at the referral hospital in Stroke Unit for thrombolysis and especially for out-of-window patients.
Needing improvements in Stroke Protocol use	Elements point to the lack of a Stroke Protocol evidenced by professionals' doubts about its existence. They understand the protocol in different ways, perceive its incipience and poorly incorporated flow, report lack of training for professionals, difficulties in the success of the protocol in ECU, perception of patient flow obstruction.
Compromising treatment by hospital bureaucratization	In hospital dynamics, there is a waste of time in the need for written authorization to make the form, in the slow preparation of the form and in the need to go through the Risk Stratification Reception (RSR) at this moment.
There is loss in care due to the population's lack of knowledge	There is a perception of window loss for most patients who arrive at health services, due to the lack of prior guidance for the population about care emergency, about suspicion of symptoms, not knowing where to refer patients.
Noting the efforts of professionals from different services to attend to window patients.	It points to professional commitment, sometimes making the protocol work, identifying and prioritizing patients in RSR in ECUs, seeking to perform SAMU care quickly, triggering Stroke Unit specialized team to assess patients in the emergency. In the same way, the SAMU, when entering the hospital, sends patients to tomography to preserve the window.

Chart 2. Action-interaction component categories and subcategories

Categories (Action-interaction)	Development of categories and subcategories
Perceiving lack of language and unique conduct in the network	Failures in communication between services and in health services are related to the perception that care varies according to the team on duty, including variations in medical conduct in the ECU in activating or not Stroke Protocol, and also in the non-homogeneity of care at the reference hospital.
Perceiving impediments in professional relations	Difficulties in the SAMU-ECU, SAMU-hospital relationships with the head of duty responsible for the hospital emergency are indicated, a relationship hampered by the workload in the emergency and in internal relationships with the ECU.
Not knowing the other's role in the network	Subcategories bring elements, such as distortion of the SAMU role in the network, lack of knowledge of the ECU role in the network, the need to better see the other service's needs, the act of referring that patients are from the service of origin and not from the network.
Finding it difficult to regulate patients in the network	It evidences hospital restriction in accepting window and out of window patients, criticizes the regulation for the hospital without a right bed, with authorization only for neurological assessment, the difficulty in contacting the head of duty, the difficulty in regulating patients outside the window and the need to regulate after counter-referral.
Sharing goals in the network	It indicates that the network counts on the collaboration of SAMU, that the ECU team cohesion is the foundation for the service operation and that hospital pre-notification is a factor for improving care. The good relationship of professionals with Stroke Unit team stands out.

Chart 3. Consequences component categories and subcategories

Categories (Consequences)	Development of categories and subcategories
Leaving Stroke care line and returning to the network	They indicate counter-referral of hospital patients to less complex units, either due to lack of hospital resources or because professionals judge patients without a maintenance profile in the tertiary unit. Sometimes these patients were not assessed by neurologists. Faced with the refusal of hospitals and ECUs, patients remain with the SAMU.
Assisting patients outside the therapeutic window	It is supported by subcategories that indicate compliance with the permanence of patients in the ECU in the face of numerous limitations in care; criticism of limitations of mobile pre-hospital care for out-of-window patients, with variations in the possibility of being assessed by the neurologist or not; often receiving generalist care.
Patients being better served when there is access to Stroke Unit	It reveals that patients with suspected or confirmed stroke have optimal care when there is advice from Stroke Unit. Data indicate that the Unit has material resources and trained personnel for the service, affirming standardization, direction to the pathology and etiological investigation.
Zero vacancy being imposed	It establishes a relationship with the lack of vacancy, being necessary that the SAMU use the 'zero vacancy' and that the reference hospital receives the imposition of this regulation, welcoming patients in a reality that is not always conducive.

Discussion

As the network is the fundamental structure for the care of seriously ill patients, which should occur with a focus on social, population and individual needs, with intersectoral interactions,[13] the phenomenon "Revealing the emergency care network fragmentation to patients with acute stroke" goes against the project proposed by SUS.

As conditioning elements of such fragmentation, the results of this study point to the lack of space and resources to care for patients with stroke, by the centralization of care in the reference hospital, which is also a reference to numerous specialties, with a profile of chronic patients who have prolonged hospitalization, which implies lower turnover of beds. Thus, it is observed that the emergency room overcrowding originates in hospital overcrowding.[14]

The lack of a thrombolysis vacancy in Stroke Unit, although less frequent, shows signs of bed failure in Stroke Unit, considering the increasing number of patients who are victims of the disease.[15] Still, considering that, usually, several factors interfere in the arrival of patients to the reference hospital in window,[16] it is essential that those who arrive have treatment available in a shorter time in order to obtain better recovery of neurological deficits.[17]

Thus, according to data, usually, the lack of vacancy happens in a greater proportion for out-of-window patients, even with acute symptoms, with its treatment and diagnosis postponed, imaging and neurological assessment not performed in the first 24 hours of the event. This fact is in contradiction with the need for targeted and effective care[1] also for out-of-window patients who need tertiary level care.

Moreover, professionals miss thrombectomy, a treatment that has the possibility of being offered in a longer time, when compared to thrombolysis,[15] but which is not yet used in the reference hospital. In Brazil, this is a managerial element, which has restricted availability in SUS,[18] due to lack of comprehensive stroke treatment centers and low availability of neurointerventional professionals.[19] However, it was introduced in other Latin American countries, being pointed out as a tool that enables high recanalization rate, low number of complications and good recovery of patients.[20]

In addition to the need for vacancies and resources, the data indicate that despite the efforts of professionals to assist patients in therapeutic window, protocols and institutional flows are also not

well established within the network. Thus, the lack of protocol constitutes a barrier to care, which could be solved with planning and management intervention. Although there are ministerial protocols, there seems to be ignorance of these tools and processes.

On the other hand, studies indicate that, when protocols are well established, they tend to reduce patient care times and suggest that establishing nurses on the hospital front line as a viable strategy, trained to recognize patients with stroke in the emergency room, as these are often the first professionals to have contact with patients, with speed, efficiency and scientific knowledge being fundamental for the success of care.[21]

Related to this, the lack of professional training pointed out by professionals from the four services investigated prevents standardization and makes it difficult to achieve success in protocols, and it is essential that professionals at the end of care know how to recognize, apply specific and simple scales for neurological assessment, quickly and reliably,[21] understanding that for this patient time is fundamental. Educational interventions to improve health professionals' technical and care knowledge regarding initial care protocols also provide space for collective reflection and analysis of the reality in which they are inserted.[22]

Moreover, in this context, SAMU professionals find obstruction in patients' flow that often make it impossible to refer them to the most appropriate destination. However, the organization of flows is one of the strategic actions proposed to expand and consolidate the line of care for stroke in adults, aiming at safe therapeutic planning at different levels of care.[23] The creation of care flows allows services and professionals to be situated within an organization and to have a definition of responsibilities, knowing where and when to refer patients in the network.

Regarding hospital bureaucracy, there are criticisms related to the need to assess patients in RSR when a pre-stratification of this patient has already been made by the SAMU team. The need to go through RSR at this time is in line with the State Risk Stratification Protocol, which provides that critically ill patients must be stabilized, entering the hospital through a specific entrance door, and risk stratification can be performed later.[24]

Among the causes of fragmentation in the network that are beyond the control of emergency health professionals, the population's misinformation appears in the research as a limiting factor for care. Considering that stroke treatment is only possible if people correctly identify signs and symptoms and seek medical attention,[25] the unsatisfactory level of knowledge of lay people is also due to the low educational level, the few educational campaigns and the reduced bond between users and teams.[26]

Data from the interviews add that obstacles in professional relationships are related to working conditions[27] and, notoriously, happen because professionals do not see the network functioning and do not see themselves as elements of this. When network elements are disconnected, there is difficulty in communication and workers' lack of knowledge about service functioning, which may compromise the articulation between them.[28] Thus, given the complexity of relationships visualized in the present study, interventions are needed regarding the organization and socio-professional relationships in order to improve cooperation in networks.[29]

Pre-notification, signaled by professionals as a previous contact between the pre-hospital service and the hospital, is an example of an element that facilitates the connection between services, which can shorten the delivery time for CT scans and improve the care of patients with acute stroke.[30] Thus, it is noted that for collaboration and teamwork to provide safe and high-quality care, effective communication, common goals, recognition of others' work, interdependence of actions and patient-centered care are necessary.[31]

In terms of consequences of network fragmentation, patients leave Stroke care line, through hospital counter-referral, which makes it impossible to continue care at the tertiary level. This is at variance with the objective of counter-referral, which is to ensure comprehensive care for patients, through organization between services, with mechanisms of agreement and establishment of flow.[28] Naturalization is also noted in the act of hospital

counter-referral when in the hall of justification of the referrer there are: the lack of patient profile when considering that those who are outside the window do not need to be welcomed in the hospital, considering that patients only need a neurological assessment and considering that patients have an ECU profile. However, Stroke Unit, located in the reference hospital, should welcome patients in acute condition, not only in the window, even if the condition is transient, regardless of severity.[32]

Thus, after the counter-referral, the destination of most of these patients is the ECU, which has limitations in care because it was not designed to be an inpatient unit, much less to be a neurological unit. In this way, these units, considered as hospital rearguards, face significant limitations in care pending regulation by the State Center, where patients remain hospitalized.[33] In this way, "hospitalization" in a pre-hospital environment contrasts with the ECU's objective, which has to refer patients in the network who have not had their complaints resolved, with the purpose of continuity of care for up to 24 hours.[34] Thus, it is essential that there is the network organization for adequate backup, and with a maximum waiting time in the ECU until referral to the hospital bed.

Otherwise, elements that facilitate care are perceived when professionals indicate that patients who had access to Stroke Unit found better care, considering the availability of a referral bed, a specialized multidisciplinary team and use of a standard approach to manage common problems after stroke,[32] including etiological investigation in order to reduce clinical conditions after admission and improve outcome after discharge.

Furthermore, the category of this study that reveals that patients are better served when there is access to Stroke Unit is intrinsically related to the lack of vacancy as a causality, because access is restricted to those in the therapeutic window, and it is necessary to expand the capacity of these units for patients outside the window in an acute condition, for patients with transient ischemic attack and for those with hemorrhagic stroke. According to the regulations on rear beds, capacity must be intrinsically related to epidemiological data,[24] accompanying its growth, which does not seem to happen in the investigated reality, since the number of beds has been maintained since the Unit implementation.

The difficulty in accessing beds leads to the need to impose a "zero vacancy" by professionals who work at the Emergency Regulation Center, directing patients to hospital units even when they do not have beds available to care for them. This is an exclusive prerogative of emergency physicians, and should be used in exceptional situations, when there is no vacancy in another suitable place for patients, being an essential resource to guarantee access to patients at risk of death or intense suffering,[35] being imposed, often, amidst of conflicts.

This can often happen due to permanent investment and valuation of the hospital component, without public policies aimed at the ECN's other elements, with the network being wrongly structured in referral hospitals, as if this were the solution to problems of other emergency care components.[35]

The limitations of this study refer to the circumscription of the results to a specific context, and there may be generalization of data in relation to the issues relevant to the study site, considering the different settings that ECN can have in Brazil. Analyzes on the care of patients with hemorrhagic stroke, nor on the comprehensiveness of care after hospital discharge were not included. However, significant advances have been observed in research on care for patients with stroke in the network, which have taken place in an expanded form, considering a better view of the process of referring patients to the health services, focusing on interprofessional relationships both within and between institutions. In all of them, nursing constitutes the majority and is effectively linked to all stages of care for this patient, being able to benefit from the results of this research, in helping to implement improvements for care and assistance to patients with stroke.

Conclusion

The findings of this study show the fragmentation between services in the care of patients with acute stroke in ECN. The care flow is not well established

and the communication mechanisms between professionals can be effective or they can encounter physical barriers and conflicts in services and between services, varying according to who is providing care. Although there are facilitating elements for care, restrictive elements reveal the need for managerial interventions to improve care, standardizing it and making care comprehensive and equitable. To this end, one of the tools that can be used is continuing education with a focus on stroke and the proper functioning of ECN.

Collaborations

Brandão PC, Lanzoni GMM and Pinto ICM declare that they contributed to the study design, data analysis and interpretation, article writing, relevant critical review of the intellectual content and approval of the final version to be published.

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