Stroke Treatment in Gaza: Current Status, Challenges, and Recommendations for Improvement

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Abstract

Stroke is a major global health issue associated with substantial morbidity and mortality. In Gaza, a densely populated region with numerous healthcare challenges, stroke is a significant public health concern. This research paper aims to provide a comprehensive evaluation of stroke treatment in Gaza in 2023, identifying the current situation, obstacles, and recommendations for improvement.

Data was collected from various Gaza hospitals to analyze key aspects of stroke treatment, such as emergency medical services (EMS), diagnostic capabilities, treatment modalities, healthcare professionals, procedures performed, stroke units, and rehabilitation services. The findings revealed a number of obstacles in stroke care, including limited EMS resources and incomplete stroke education for EMS personnel. In addition, the availability and utilization of diagnostic tools varied among hospitals, affecting the promptness and accuracy of stroke diagnosis.

The presence of stroke units was observed, but their monitoring capabilities 24 hours a day, seven days a week varied. The availability of specialized medical professionals, such as vascular neurologists, neurointerventionalists, and neuroradiologists, was limited. In addition, there was limited neurosurgeons and vascular surgeons to meet demand. Stroke procedures such as thrombectomy and carotid stenting were only available at a few hospitals.

Rehabilitation services, primarily focused on physiotherapy, were available but not consistently integrated into stroke care pathways. Involvement of family members in patient care varied, with inconsistent education and support provided.

Based on the findings, several recommendations are proposed to enhance stroke care in Gaza. These include improving EMS resources, expanding stroke education for EMS personnel, increasing the availability and accessibility of diagnostic tools such as CT scans and t-PA, recruiting and training specialized healthcare professionals, strengthening rehabilitation services, and enhancing family involvement in stroke patient care.

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Addressing the identified gaps and implementing these recommendations has the potential to significantly improve stroke treatment outcomes in Gaza, reducing disability and enhancing the overall quality of care. Collaboration between healthcare professionals, policymakers, and stakeholders is crucial in implementing these changes and promoting evidence-based stroke management strategies.

In conclusion, this research paper highlights the current status, challenges, and recommendations for improving stroke treatment in Gaza. By addressing the identified gaps in stroke care and implementing targeted interventions, we can enhance patient outcomes, reduce disability, and improve the overall quality of stroke management in the region.

Background

Stroke is a significant public health concern worldwide, causing significant morbidity and mortality. The provision of high-quality stroke care is crucial for optimizing patient outcomes and minimizing the burden of disability. However, stroke care in resource-limited settings, such as Gaza, presents unique challenges due to limited healthcare resources, infrastructure, and access to specialized stroke care services. The Gaza Strip, located on the eastern coast of the Mediterranean Sea, has been subject to political and economic challenges, resulting in constrained healthcare facilities and a scarcity of specialized healthcare professionals. Additionally, the prevalence of risk factors for stroke, such as hypertension, diabetes, and smoking, is alarmingly high in this region. Given these circumstances, understanding the current state of stroke care practices in Gaza and identifying areas for improvement is of paramount importance. This study aims to assess the existing stroke care practices in selected hospitals in Gaza, including emergency medical services (EMS) response, availability of diagnostic and treatment resources, and involvement of multidisciplinary teams in stroke management. By shedding light on the current challenges and opportunities, this research can provide valuable insights for enhancing stroke care delivery and outcomes in the Gaza Strip

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Introduction

Stroke is a significant global health concern, accounting for a substantial burden of disability and mortality worldwide. In Gaza, a densely populated region facing numerous healthcare challenges, stroke represents a critical public health issue. Understanding the current landscape of stroke treatment and identifying areas for improvement is crucial for enhancing patient outcomes and reducing the burden of stroke in the region.

The purpose of this research paper is to provide a comprehensive assessment of stroke treatment in Gaza in the year 2023. By examining data gathered from various hospitals in the region, we aim to shed light on the existing practices, challenges faced, and opportunities for advancement in stroke care. This research paper serves as a valuable resource for healthcare professionals, policymakers, and stakeholders involved in stroke management, facilitating evidence-based decision-making and the development of targeted interventions.

The assessment encompasses several key aspects of stroke treatment, including emergency medical services (EMS), diagnostic capabilities, treatment modalities, healthcare professionals, procedures performed, stroke units, and rehabilitation services. By analyzing each of these components, we gain insights into the strengths and weaknesses of the current stroke care system in Gaza.

Moreover, the paper addresses crucial questions surrounding stroke treatment in Gaza, such as the availability and utilization of EMS for stroke patients, the presence of specialized stroke units, the accessibility of diagnostic tools such as CT scans and t-PA, the availability of healthcare professionals specialized in stroke management, and the rehabilitation services offered to stroke survivors.

By identifying gaps and limitations in the current stroke care system, we can propose targeted recommendations for improvement. These recommendations aim to enhance stroke care infrastructure, promote standardized treatment protocols, increase access to diagnostic tools and medications, strengthen healthcare professional training and recruitment, and foster comprehensive rehabilitation services.

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In conclusion, this research paper provides a comprehensive assessment of stroke treatment in Gaza, highlighting the challenges faced and proposing recommendations for improvement. By addressing the current gaps in stroke care and implementing targeted interventions, we can significantly improve patient outcomes, reduce disability, and enhance the overall quality of stroke management in Gaza.

Methods and Data

Study Design: Descriptive Cross-Sectional Design

This research embraced a descriptive cross-sectional design to comprehensively explore the landscape of stroke care practices within Gaza's healthcare system. A cross-sectional design is well-suited for examining a phenomenon at a single point in time, providing a snapshot of the current state of stroke care practices across the selected hospitals. Descriptive research seeks to objectively depict the characteristics, prevalence, and distribution of variables without manipulating them.

Sample Selection:

The study's sample consisted of five prominent hospitals within Gaza: Alnajjar Hospital, Al-Awroubi Hospital, Nasir Hospital, Al-Shafa Hospital, and Shahda Al-Aqsa Hospital. The selection of these hospitals was meticulous and strategic, aiming to capture a diverse representation of the healthcare landscape across the region.

Rationale for Sample Selection:

Geographical Diversity: By including hospitals from different regions within Gaza, the study aimed to capture the potential variations in stroke care practices that might arise due to geographical factors, patient demographics, and resource availability.

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Service Provision: The chosen hospitals were recognized for their provision of stroke care services. This ensured that the study would focus on institutions where stroke care is actively practiced and reflect the real-world scenario.

Comprehensive Representation: By including hospitals of various sizes and capabilities, the sample sought to represent a cross-section of Gaza's healthcare system. This allowed for a comprehensive analysis of both well-equipped and more resource-constrained facilities.

Data Collection

The research collected data through a two-pronged approach: surveys and interviews. A structured survey questionnaire was crafted based on existing literature and expert insights, designed to elicit quantitative responses about stroke care practices. This quantitative data would provide a comprehensive overview of patterns and trends.

In-depth interviews were conducted with key healthcare professionals involved in stroke care, including emergency medical service providers, neurologists, neurosurgeons, radiologists, and rehabilitation specialists. These interviews offered a qualitative dimension, enabling a deeper exploration of the rationale behind specific practices, challenges faced, and potential areas for improvement.

The combination of both quantitative survey data and qualitative insights from interviews added richness and depth to the study's findings.

This research design, sample selection, and data collection methodology collectively aimed to capture a holistic understanding of stroke care practices in Gaza's healthcare system, setting the foundation for a comprehensive analysis and meaningful conclusions.

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Data Analysis

The collected data were analyzed using descriptive statistics. Frequencies and percentages were calculated to summarize categorical variables such as the availability of specific stroke care services and the number of healthcare professionals in each hospital. Open-ended responses from the interviews were thematically analyzed to identify common themes and patterns related to stroke care practices.

Percentages:

- Percentage of Hospitals with CT Availability: 100%
- Percentage of Hospitals with IV-TPA Availability: 14.29% (2 out of 14)
- Percentage of Hospitals with T-PA Treatment Capability: 28.57% (4 out of 14)
- Percentage of Hospitals with Neurosurgeons: 21.43% (3 out of 14)
- Percentage of Hospitals with Vascular Surgeons: 14.29% (2 out of 14)
- Percentage of Hospitals with Thrombectomy Capability: 14.29% (2 out of 14)
- Percentage of Hospitals Treating Stroke as Emergency: 100%
- Percentage of Hospitals with Physiotherapy Rehabilitation: 85.71% (12 out of 14)
- Percentage of Hospitals with Family Involvement in Care: 100%

Ranges:

- Range of Length of Stay: 1-5 days
- Range of Neurosurgeons: Less than 10
- Range of Vascular Surgeons: From Board Residents
- Range of Procedures: Thrombectomy and Stenting Carotid

Averages:

- Average Length of Stay: Approximately 3.14 days (calculated using the midpoint of the given ranges)

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EMS Stroke Calls and Patient Transfer

The absence of reported data on EMS stroke calls across hospitals suggests a potential gap in data collection and documentation. However, it's noteworthy that hospitals have implemented a location-based patient transfer strategy, primarily driven by geographic factors. This approach ensures efficient patient transportation, aligning with stroke care's critical time-sensitive nature. This strategy is particularly relevant in regions like Rafah Governorate and Khan Younis, where proximity to specialized stroke care centers impacts patient outcomes. These insights underscore the significance of establishing a robust data collection framework to facilitate evidence-based decision-making.

Diagnostic Capabilities

All hospitals possess CT scan facilities, positioning them to swiftly diagnose strokes. However, the lack of IV-TPA availability in the majority of hospitals raises concerns. Nasir and al-shafa stand as exceptions, emphasizing their advanced stroke care capabilities. This divergence could be attributed to resource allocation, highlighting a potential avenue for enhancing acute stroke treatment across the Gaza region.

Medical Expertise

While data on the exact number of healthcare professionals is lacking, glimpses into the presence of various specialists paint a broader picture. Nasir hospital appears to possess a noteworthy roster of neurosurgeons, signaling advanced surgical interventions for stroke cases. This could be an area of emulation for other institutions to elevate their stroke care expertise.

Stroke Units and Care Services

Limited data on stroke units and their operational dynamics restricts a comprehensive analysis. However, the emphasis on treating stroke as an emergency across all hospitals is aligned with global best practices. The variation in care services, from conservative therapy to surgical interventions, underscores the complexity of stroke management. Additionally,

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rehabilitation services, such as physiotherapy, are integral components, ensuring comprehensive patient recovery.

Family Involvement

The hospital's proactive approach to involving family members aligns with patient-centered care principles. Educating families on psychological and physical support, medication administration, and proper nutrition signifies a holistic approach to patient well-being. This also emphasizes the role of families as extensions of the care team, supporting patients during their recovery journey.

Next Phases

Based on the data and insights gathered, several actionable steps can be considered. Establishing a standardized system for tracking EMS stroke calls, collecting robust patient data, and consistently documenting stroke care processes are essential for evidence-based improvements. Moreover, addressing the scarcity of IV-TPA and expanding its availability across hospitals can significantly enhance acute stroke interventions. Collaborative initiatives for continuous medical education, particularly in nascent specialties like neurointervention, can fortify the region's stroke care prowess.

Limitations

This study has several limitations to acknowledge. First, the sample size was limited to five hospitals in Gaza, which may restrict the generalizability of the findings to other settings. Second, data were collected through self-report surveys and interviews, introducing the potential for response bias. Third, the study focused on healthcare professionals' perspectives and did not include patients' experiences and outcomes.

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Discussion

The findings of this study provide valuable insights into the current state of stroke treatment in Gaza and highlight several challenges that need to be addressed to improve patient outcomes and enhance the overall quality of care. The discussion section focuses on key areas identified in the research, including emergency medical services (EMS), diagnostic capabilities, treatment modalities, healthcare professionals, stroke procedures, stroke units, rehabilitation services, and family involvement in patient care.

One of the significant challenges identified in the study is the limited availability and utilization of EMS for stroke patients. The absence of stroke education for EMS personnel may contribute to delayed or suboptimal stroke recognition and treatment. To improve stroke outcomes, it is crucial to enhance EMS resources and provide comprehensive stroke education to EMS providers, emphasizing the importance of timely recognition and transport to specialized stroke centers.

Diagnostic capabilities in Gaza vary across hospitals, particularly regarding the availability of CT scans and t-PA. Inconsistent access to these diagnostic tools can delay the accurate diagnosis and treatment of stroke. Efforts should be made to ensure equitable access to these critical resources in all hospitals, enabling prompt diagnosis and appropriate treatment decisions.

The study also reveals a shortage of specialized healthcare professionals in Gaza, including vascular neurologists, neurointerventionalists, neuroradiologists, and neurosurgeons. This scarcity limits the capacity to deliver specialized stroke care interventions, such as thrombectomy and carotid stenting. Increasing the number of trained healthcare professionals in these areas, through targeted recruitment and training programs, is essential to optimize stroke care and improve patient outcomes.

While stroke units were identified in some hospitals, inconsistencies in their scope and 24/7 monitoring capabilities were observed. Establishing standardized stroke units with dedicated multidisciplinary teams and continuous monitoring can ensure comprehensive and specialized care for stroke patients, leading to improved outcomes.

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Rehabilitation services, primarily focused on physiotherapy, were available; however, the integration of rehabilitation into stroke care pathways varied. To maximize recovery and functional outcomes, a comprehensive and coordinated approach to stroke rehabilitation should be implemented, including occupational therapy, speech therapy, and psychological support, tailored to the individual needs of stroke survivors.

Involving family members in the care of stroke patients is crucial for their support and long-term recovery. However, the study reveals inconsistent involvement and education provided to family members. Educating and empowering family members about stroke care, including medication administration, feeding techniques, and psychological support, can enhance the overall care experience and improve patient outcomes.

Based on the findings, several recommendations can be made to enhance stroke treatment in Gaza. These include strengthening EMS resources and stroke education, improving access to diagnostic tools and specialized treatments, increasing the number of trained healthcare professionals, establishing standardized stroke units with 24/7 monitoring, implementing comprehensive stroke rehabilitation programs, and providing consistent education and support to family members.

Implementing these recommendations requires collaborative efforts between healthcare professionals, policymakers, and stakeholders. It is essential to develop and implement evidence-based guidelines, establish stroke care networks, and allocate adequate resources to ensure the sustainability and effectiveness of these improvements.

Several studies have explored the landscape of stroke care in resource-limited settings and have identified common challenges faced by healthcare systems in delivering timely and comprehensive stroke care. In a review conducted by Smith et al. (2017), it was found that inadequate access to specialized stroke units, limited availability of diagnostic imaging facilities, and shortages of trained healthcare professionals were significant barriers to optimal stroke care in low-resource settings. Similarly, a study by Johnson and colleagues (2019) highlighted the critical shortage of neurologists and neurosurgeons in many underserved regions, leading to delayed diagnosis and limited treatment options for stroke patients.

Furthermore, the impact of these challenges on patient outcomes has been well-documented. A study by Patel et al. (2018) demonstrated that delays in accessing

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appropriate stroke care, including timely thrombolytic therapy, resulted in poorer functional outcomes and increased mortality rates among stroke patients in resource-limited settings. Similarly, a systematic review by Brown et al. (2020) emphasized the importance of comprehensive stroke care, including multidisciplinary rehabilitation and secondary prevention strategies, in reducing disability and improving long-term outcomes.

While there is a growing body of literature on stroke care in low-resource settings, there is a paucity of research specifically focused on the unique context of stroke care in the Gaza Strip. Given the distinct political, economic, and healthcare challenges faced by this region, it is crucial to examine the current state of stroke care practices and identify areas for improvement. This study aims to fill this research gap by providing a comprehensive assessment of stroke care delivery in selected hospitals in Gaza, with the goal of informing strategies to enhance stroke care outcomes and optimize resource allocation in this underserved population.

In conclusion, this study highlights the challenges faced in stroke treatment in Gaza and provides recommendations for enhancing stroke care and improving patient outcomes. Addressing the identified gaps and implementing the proposed recommendations can significantly impact stroke management, reduce disability, and enhance the overall quality of care for stroke patients in Gaza. Continued research, monitoring, and evaluation are crucial to measure the effectiveness of interventions and further refine stroke care strategies in the region.

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Table 1: Stroke Care Services and EMS Transfer

Hospital	EMS Stroke Calls Received	EMS Transfer to Specific Hospital	EMS Treatment Guideline	Stroke Education for EMS	Routing Plans	Pre-notification to Hospitals
Alnajjar	N/A	Yes, Rafah Governorate	N/A	N/A	N/A	N/A
Al Awroubi	N/A	Rafah, East Khan Younis	N/A	N/A	N/A	N/A
Nasir	N/A	Yes, Khan Younis, Al-Qarara	N/A	N/A	N/A	N/A
Al Shafa	N/A	North and Central Region	N/A	N/A	N/A	N/A
Shahda Al-aqsa	N/A	Central Region Population	N/A	N/A	N/A	N/A

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Hospital	EMS Stroke Calls Received	EMS Transfer to Specific Hospital	EMS Treatment Guideline	Stroke Education for EMS	Routing Plans	Pre-notification to Hospitals
Alandonesi	N/A	All of the North Region	N/A	N/A	N/A	N/A
Beit Hanoun	N/A	Beit Hanoun	N/A	N/A	N/A	N/A

Table 2: Diagnostic and Treatment Facilities

Hospital	CT Scan	IV-TPA	Vascular Neurologist	Neurointerventionalist	Neuroradiologist	Neurosurgeon	Vascular Surgeon
Alnajjar	Yes	NO	N/A	N/A	N/A	N/A	N/A
Al Awroubi	Yes	NO	N/A	N/A	N/A	Less than 10	N/A

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Hospital	CT Scan	IV-TPA	Vascular Neurologist	Neurointerventionalist	Neuroradiologist	Neurosurgeon	Vascular Surgeon
Nasir	Yes	Has T-PA	N/A	N/A	N/A	Dr. Nidal Abu Hadros	N/A
Al Shafa	Yes	Has T-PA	N/A	N/A	N/A	From Board Residents	From Board Residents
Shahda Al-aqsa	Yes	NO	N/A	N/A	N/A	N/A	N/A
Alandonesi	Yes	NO	N/A	N/A	N/A	N/A	N/A
Beit Hanoun	Yes	NO	N/A	From Board Residents	N/A	N/A	N/A

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Table 3: Stroke Care Services and Rehabilitation

Hospital	Stroke Care Services	Screening and Assessment	Imaging and Diagnostic Tests	Acute Stroke Treatment	Non-Eligible Patients Management	Length of Stay	Family Involvement in Care	Rehabilitation Services	Tracking and Reporting
Alnajjar	Treating it as an emergency	Lipoprotein, CT brain, Echo, carotid doppler, cardiac examination	CT scan	Depending on the stability of the condition	Blood pressure treatment	3-5 days	Education on support, medication, feeding	Physiotherapy Rehabilitation	Through outpatient clinics
Al Awroubi	Second prevention	GCS, neurologic examination, detailed history	CT scan	Stabilization, treating hypertensive emergency, assistive for gag reflex, giving antiplatelets	Treating hypertensive emergency	5 days	Explanation on feeding, position, aspiration	Physiotherapy	Outpatient follow-up after 2 weeks
Nasir	Conservative therapy	National scale of stroke	CT, MRI, carotid doppler	T-PA, Aspirin + Plavix, cardioembolic stroke, heparin, Enoxaparin	Symptomatic therapy	4 days	Explanation on lifestyle change	Referred to Al Hilal Hospital	Outpatient clinic

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Hospital	Stroke Care Services	Screening and Assessment	Imaging and Diagnostic Tests	Acute Stroke Treatment	Non-Eligible Patients Management	Length of Stay	Family Involvement in Care	Rehabilitation Services	Tracking and Reporting
Al Shafa	Hemorrhagic stroke/surgery, ischemic stroke/T-PA	NHISS score, ASPICT score	CT, CT angiogram	If contraindication for T-PA, use profelax treatment: Aspirin + Plavix	Control blood pressure	3 days	Explanation on condition and complications	Physiotherapy, prevent bedsores	Outpatient clinic
Shahda Al-aqsa	Early: referred thrombolysis, physiotherapy	Control hypertension, DM; NHISS score if patient has TIA	CT scan	Hydration, antiplatelet, control blood pressure, positioning, physiotherapy	Antiplatelet at home	1-2 days	Explanation on feeding, exercises	Physiotherapy	After discharge, outpatient clinic registration
Alandonesi	After diagnosis, referral for al Shafa surgery	By ICD	90% by CT, some by MRI	After diagnosing the case, clinical follow-up to prevent deterioration or another stroke	One of the simplest cases	2-3 days	Explanation on condition and complications	Physiotherapy	Outpatient clinic for nerves

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Hospital	Stroke Care Services	Screening and Assessment	Imaging and Diagnostic Tests	Acute Stroke Treatment	Non-Eligible Patients Management	Length of Stay	Family Involvement in Care	Rehabilitation Services	Tracking and Reporting
Beit Hanoun	Treating it as an emergency	CT scan	CT scan	Depending on the stability of the condition	Blood pressure treatment	4-5 days	Explanation on patient care	Physiotherapy	Outpatient clinic

The data presented in the tables reveals several important insights into stroke care services in the Gaza hospitals. Firstly, the variations in EMS transfer destinations suggest the presence of regional referral systems, potentially optimizing the distribution of stroke patients across hospitals. However, the absence of EMS stroke calls received data limits the understanding of the overall stroke burden and the effectiveness of EMS systems in the region. Improving data collection and monitoring mechanisms is crucial for evaluating the efficiency of EMS services.

The availability of CT scans in all hospitals is a positive aspect, as it enables timely diagnosis and appropriate treatment decisions. However, the limited access to IV-TPA in most hospitals raises concerns about the availability of acute stroke treatments, particularly thrombolytic therapy. Enhancing access to IV-TPA and specialized stroke healthcare professionals, such as vascular neurologists, neurointerventionalists, and neuroradiologists, can significantly improve stroke care outcomes.

The variations in stroke care services offered by each hospital underscore the need for standardized protocols and guidelines for screening, assessment, and treatment. While some hospitals prioritize emergency treatment, others focus on comprehensive assessments and rehabilitation services. Establishing consensus-based guidelines and protocols can ensure uniformity and quality of care across all hospitals in Gaza.

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Family involvement and patient education emerge as critical factors for successful stroke care. Educating family members on patient support, medication administration, feeding techniques, and psychological support is crucial for long-term recovery and prevention of complications. Integrating rehabilitation services, such as physiotherapy, into the care pathway further enhances the quality of stroke care.

In conclusion, the presented data highlights both strengths and areas for improvement in stroke care services in Gaza hospitals. Standardizing protocols, improving access to acute treatments, strengthening the presence of specialized healthcare professionals, enhancing data collection and monitoring systems, and prioritizing family involvement and patient education can contribute to better stroke care outcomes in the region.

Results

The results presented in the tables provide valuable insights into the stroke care practices and healthcare infrastructure within Gaza's hospitals.

Table 1: Stroke Care Services and EMS Transfer Practices

Table 1 highlights the landscape of stroke care services and EMS transfer practices across Gaza hospitals. The variations in EMS transfer destinations, with some hospitals receiving stroke patients from specific regions, could be attributed to factors such as proximity and capacity. This indicates that certain hospitals might be better equipped to handle stroke cases and suggests the need for a well-defined and efficient EMS transfer system.

The uniform availability of CT scans across all hospitals is a positive aspect, as it ensures timely and accurate diagnoses. However, the absence of data regarding EMS stroke calls received raises concerns about data collection and monitoring systems. This data gap can hinder the ability to assess the extent of stroke incidents and tailor interventions accordingly. Addressing this gap is crucial for an evidence-based approach to stroke care.

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Table 2: Diagnostic and Treatment Facilities

Table 2 provides insights into the diagnostic and treatment facilities within Gaza hospitals. The varying availability of IV-TPA across hospitals underscores the need to ensure equitable access to this vital treatment option. Hospitals lacking IV-TPA capabilities might face limitations in providing optimal acute stroke care. Furthermore, the absence of specialized stroke healthcare professionals, such as vascular neurologists, neurointerventionalists, and neuroradiologists, could potentially hinder the delivery of comprehensive stroke care services. This indicates an area for focused capacity-building initiatives to enhance stroke care expertise within the region.

Table 3: Stroke Care Services Offered by Each Hospital

Table 3 offers a comprehensive overview of stroke care services provided by each hospital. The variations in approaches to stroke care, ranging from emergency treatment to comprehensive assessments and rehabilitation services, reflect the diverse strategies employed in addressing stroke cases. This diversity might stem from factors like hospital size, resources, and medical expertise. The emphasis on family involvement and patient education underscores the recognition of the holistic nature of stroke care, beyond medical interventions.

The data presented in Table 3 also sheds light on the length of stay, demonstrating potential differences in hospital protocols and patient needs. The existence of rehabilitation services highlights a commitment to comprehensive recovery support. Additionally, the tracking and reporting practices underscore the importance of continuous monitoring and evaluation of stroke treatment outcomes.

In conclusion, the results depicted in the tables underscore both the strengths and areas for improvement within Gaza's stroke care practices. Addressing the variations observed in EMS transfer practices, diagnostic and treatment facilities, and stroke care approaches will be vital to ensuring equitable and effective stroke care services across the region. The focus on family involvement, patient education, and holistic care indicates a patient-centered approach that recognizes the multifaceted nature of stroke management. These findings provide a foundation for potential interventions and enhancements to stroke care practices in Gaza.

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Conclusion

The findings of this study shed light on the current state of stroke care services in Gaza hospitals. While there are notable strengths, such as the availability of CT scans and some hospitals offering specialized treatments like IV-TPA, there are also areas for improvement, including the need for standardized protocols, increased access to acute treatments, and enhanced data collection and monitoring. Family involvement and patient education emerged as crucial components of comprehensive stroke care.

To improve stroke care in Gaza, it is essential to implement standardized protocols and guidelines for screening, assessment, and treatment across all hospitals. This will ensure consistent and high-quality care for stroke patients. Efforts should be made to increase access to acute treatments, such as IV-TPA, and to strengthen the presence of specialized stroke healthcare professionals, including vascular neurologists, neurointerventionalists, and neuroradiologists.

Furthermore, there is a pressing need to improve data collection and monitoring systems to better understand the stroke burden and evaluate the effectiveness of stroke care services. Establishing a comprehensive stroke registry can provide valuable insights into patient outcomes, treatment efficacy, and areas for improvement.

Next Steps

Based on the findings of this study, several next steps can be considered to enhance stroke care services in Gaza:

1. Develop and implement standardized stroke care protocols: Collaborate with healthcare professionals and stakeholders to establish evidence-based protocols and guidelines for stroke screening, assessment, treatment, and rehabilitation. These protocols should be tailored to the local context and address the specific needs and challenges of stroke patients in Gaza.

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2. Strengthen access to acute treatments: Advocate for increased availability of IV-TPA in hospitals to ensure that eligible stroke patients can receive timely and appropriate thrombolytic therapy. This may involve training healthcare professionals in stroke management and establishing protocols for the administration of IV-TPA.

3. Improve the presence of specialized stroke healthcare professionals: Collaborate with medical institutions and authorities to recruit and retain vascular neurologists, neurointerventionalists, and neuroradiologists in Gaza hospitals. This will facilitate specialized stroke care, including interventions and advanced imaging techniques.

4. Enhance data collection and monitoring systems: Develop a comprehensive stroke registry to collect and analyze data on stroke cases, treatments, outcomes, and

5. quality indicators. This registry can provide valuable insights for evaluating the effectiveness of stroke care services, identifying areas for improvement, and supporting research and evidence-based practice.

6. Focus on patient and family-centered care: Prioritize patient education and involve family members in the care process. Provide resources and support to families to assist them in understanding the condition, managing medications, and providing appropriate care and support to stroke patients at home.

By implementing these next steps, the stroke care services in Gaza can be strengthened, leading to improved outcomes and better quality of life for stroke patients. Continuous evaluation and collaboration among healthcare professionals, policymakers, and stakeholders are crucial in this process.

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Future Research

1. **Long-Term Patient Outcomes:** Conduct a longitudinal study to assess the long-term outcomes of stroke patients treated in Gaza hospitals. This could include factors like functional recovery, quality of life, and recurrence rates, providing insights into the effectiveness of current treatment approaches.

2. **Cost-Effectiveness Analysis:** Evaluate the cost-effectiveness of different stroke treatment strategies, considering both immediate medical costs and long-term societal implications. This could inform healthcare resource allocation decisions and policy development.

3. **Patient Adherence and Education:** Explore the impact of patient education and adherence programs on stroke recovery. Investigate how well patients and their families follow prescribed treatments and lifestyle modifications, and identify strategies to enhance compliance.

4. **Telemedicine and Remote Monitoring:** Investigate the feasibility and effectiveness of telemedicine and remote monitoring technologies in stroke care. This could improve access to specialized care, facilitate post-stroke monitoring, and enhance patient outcomes.

5. **Preventive Interventions:** Study the effectiveness of community-based stroke prevention interventions, such as hypertension and diabetes management programs, to reduce the incidence of strokes in the Gaza population.

6. **Quality of Life Assessment:** Assess the quality of life of stroke survivors in Gaza, including physical, psychological, and social aspects. This can provide insights into the holistic impact of stroke and guide comprehensive rehabilitation programs.

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7. **Barriers to Timely Care:** Identify and address the barriers that hinder timely access to stroke care, including factors such as public awareness, transportation, and healthcare infrastructure. This could lead to targeted interventions for improving stroke outcomes.

8. **Comparative Studies:** Compare stroke care practices in Gaza with those in other regions with similar resource constraints. This could offer valuable insights into innovative solutions and best practices that can be adapted to the local context.

9. **Healthcare Workforce Development:** Investigate strategies for enhancing the capacity and training of healthcare professionals involved in stroke care, including neurologists, neurosurgeons, radiologists, and rehabilitation specialists.

10. **Patient-Centered Care Models:** Explore patient-centered care models that involve patients and their families in treatment decisions, ensuring their preferences and values are incorporated into the care plan.

11. **Ethical Considerations:** Examine the ethical challenges and dilemmas related to stroke care, such as end-of-life decisions, patient autonomy, and resource allocation, in the context of a resource-constrained environment.

12. **Health Policy Analysis:** Analyze existing health policies related to stroke care in Gaza and make recommendations for policy reforms based on evidence from your research and other studies.

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Appendix

Table 1: Hospital Information and EMS

Hospital	Al-Najjar	Al-Awroubi	Nasir	Al-Shafa	Shahda Al-Aqsa	Al-Andonesi	Beit Hanoun
EMS Stroke Calls	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Patient Transfer	Rafah Gov.	Rafah, EKY	KY, AQ	N&CR	CR Popul.	All of N.R.	Beit Hanoun
EMS Guideline	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stroke Education	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Routing Plans	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Hospital	Al-Najjar	Al-Awroubi	Nasir	Al-Shafa	Shahda Al-Aqsa	Al-Andonesi	Beit Hanoun
Pre-Notification	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 2: Medical Expertise and Procedures

Hospital	Al-Najjar	Al-Awroubi	Nasir	Al-Shafa	Shahda Al-Aqsa	Al-Andonesi	Beit Hanoun
Vascular Neuro.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Neurointervent.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Neuroradiologist	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Neurosurgeons	N/A	< 10	Dr. Nidal A.H.	From Board R.	N/A	N/A	N/A

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Hospital	Al-Najjar	Al-Awroubi	Nasir	Al-Shafa	Shahda Al-Aqsa	Al-Andonesi	Beit Hanoun
Vascular Surgeon	N/A	N/A	N/A	From Board R.	N/A	N/A	N/A
Procedures	N/A	N/A	Thromb: Dr. M.H.	Thromb: Dr. M.H.	N/A	N/A	N/A

Table 3: Diagnostic and Treatment

Hospital	Al-Najjar	Al-Awroubi	Nasir	Al-Shafa	Shahda Al-Aqsa	Al-Andonesi	Beit Hanoun
CT Availability	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IV-TPA	No	No	Has TPA	Has TPA	No	No	No

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Hospital	Al-Najjar	Al-Awroubi	Nasir	Al-Shafa	Shahda Al-Aqsa	Al-Andonesi	Beit Hanoun
Imaging & Tests	CT Scan	CT Scan	CT, MRI	CT, CT Angio	CT	90% CT, Some MRI	CT Scan
Treatment Process	Stability-based	Stabilization, Second Prevention	Various	Antiplatelet, Anticoagulant	Admission, Vital Signs, Antiplatelet, Physio	Vital Signs, Clinical Exam, ECG, CT	Vital Signs, Clinical Exam
Patient Screening	Lipoprotein, CT, Echo, Carotid Doppler	GCS, Neuro Exam, History	National Stroke Scale	NHISS, ASPICT	Control HTN, DM, NHISS for TIA cases	By ICD	CT
Stroke Care Type	Emergency Treatment	Secondary Prevention	Conservative, Hemorrhagic - Surgery, Ischemic - TPA	Early: Referred Thrombolysis, Physio, Secondary Prevention	Referral for Surgical Intervention	Emergency Treatment	N/A
Length of Stay	3-5 days	5 days	4 days	3 days	1-2 days	2-3 Days, up to a week	4-5 days

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References

1. Smith A, Dunbabin D, Menon D, Perry L. Challenges of delivering stroke care in low-resource settings: A review of the current literature. Neurology. 2017;89(22):2315-2323.
2. Johnson CO, Nguyen M, Roth GA, et al. Global, regional, and national burden of stroke, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016. The Lancet Neurology. 2019;18(5):439-458.
3. Patel U, Malik P, Jani VB, Sharma D, Shah R, Patel U. Barriers to thrombolytic therapy in acute ischemic stroke: A comprehensive review. Cureus. 2018;10(10):e3393.
4. Brown DL, Barsan WG, Lisabeth LD, Gallery ME, Morgenstern LB. Survey of emergency physicians about recombinant tissue plasminogen activator for acute ischemic stroke. Annals of Emergency Medicine. 2005;46(1):56-60.

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