Planning health service rates to enhance urban epidemic readiness A study of Menoufia Governorate's communities

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Abstract

The provision of health services in Egypt involves various entities, creating challenges in addressing urban health needs, especially during epidemics like COVID-19. This research examines how health service rates adapt to global changes to improve urban preparedness during outbreaks. It will clarify health facility location selection and evaluate how new cities can enhance service efficiency, along with exploring the role of artificial intelligence in health services.

The research will identify requirements for implementing health service rates using geographic information systems to inform policies for better infrastructure, equipment, and human resources. A descriptive, analytical, and comparative approach will assess the role of health service rates in strengthening epidemic readiness in Egypt. Descriptive analysis will focus on current urban health service rates, while analytical exploration will review historical epidemic data for service quality and outcomes. The comparative aspect will analyze urban health service rates in Barakat El Sabaa City and Sadat City to learn from various epidemic response strategies.

The research concludes that transitioning from static, rate-based planning to dynamic, data-driven frameworks is essential for enhancing urban epidemic readiness.

Keywords: Urban planning, Urban communities, health service rates, efficiency of health service provision, epidemics

1- Introduction

The health services system in the Arab Republic of Egypt faces multiple and complex challenges, including growing fears of epidemic outbreaks, which necessitate a high level of readiness in surveillance and response systems. This is compounded by economic pressures stemming from regional conflicts that adversely affect the Egyptian economy and limit the state's ability to adequately fund the health sector. Health services in Egypt are provided through a diverse network of institutions, including governmental bodies, the

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private sector, and civil society organizations. This multi-level system aims to achieve comprehensive coverage for all citizens.

The importance of this system became particularly evident during the COVID-19 pandemic, which highlighted the need to reassess the efficiency of health service planning and its capacity to address emergency crises. In light of this, the Egyptian government has recently adopted new strategies to strengthen the sector, manifested in increased budget allocations and the launch of large-scale health initiatives. This raises questions about the effectiveness of these efforts in improving the quality of health services provided.

1-1- Research Objectives

This research primarily aims to achieve the following objectives:

* To analyze the structure of the health service delivery system in Egypt across its three levels and the role of each level in achieving health coverage.

* To identify the main economic and epidemiological challenges facing the Egyptian health sector and affecting its performance.

* To evaluate the Egyptian government's response to these challenges by analyzing the increase in the health budget allocation and the health initiatives launched in recent years.

1-2- Research Questions

Based on the aforementioned objectives, this research seeks to answer the following questions:

* What are the components and structure of the health service delivery system in the Arab Republic of Egypt, and how are roles distributed among its different levels?

* What are the primary economic and epidemiological challenges that affect the efficiency and sustainability of the Egyptian health sector?

* To what extent have government initiatives and increased budget allocations succeeded in improving the quality and coverage of health services provided to citizens in Egypt?

1-3- Research Methodology

This research utilized an integrated methodology that combined both descriptive-analytical and comparative approaches. The descriptive approach was employed to outline the current structure of Egypt’s health services system and its established planning standards. Meanwhile, the analytical approach was used to evaluate the system’s performance, identify the gap between approved standards and their actual implementation on the ground, and analyze the government’s response to health challenges.

To apply this methodology, the research adopted a case study approach, selecting two contrasting models within the Menoufia Governorate: Berket El Sabaa City, representing existing urban communities, and Sadat City, representing new, planned urban communities. This comparative framework allowed for an evaluation of the effectiveness of health service standards in different urban contexts and facilitated the extraction of lessons learned from the strategies implemented in each city.

For data collection, the research primarily

relied on the analysis of secondary data and official sources. These included reports from the Ministry of Planning, guidelines from the General Authority for Urban Planning, statistical data for the Menoufia Governorate, and directives issued by the World Health Organization (WHO). Additionally, Geographic Information Systems (GIS) were utilized as a spatial analysis tool to illustrate the geographical distribution of health services and assess their coverage and accessibility in the studied cities.

Limitations of the Study: This research acknowledges its exclusive reliance on secondary data. While this provides a comprehensive view at the planning level, it does not cover qualitative dimensions such as patient-perceived service quality.

2- Analysis of the Health System in Egypt

The provision of health services in Egypt is based on three basic levels:

* First Level: Provides basic healthcare to citizens through family health programs and primary healthcare units in rural and urban areas, aiming to ensure comprehensive coverage with high-quality services.

* Second Level: Comprises central hospitals in the capitals of administrative centers, offering specialized services through outpatient clinics and internal departments.

* Third Level: Is represented by major public hospitals in the capitals of governorates, supported by university hospitals, educational hospitals, and private sector and health insurance hospitals.

In response to existing challenges, the budget for the fiscal year 2023/2024 saw a significant increase, with 20.6 billion EGP allocated for health services, marking a 30% increase from the previous fiscal year's budget of 15.9 billion EGP [1]. The plan focuses on providing therapeutic services, including specialized surgeries and the management of complex injuries, in addition to monitoring chronic diseases such as hypertension, diabetes, kidney failure, and tumors.

To support these efforts, various health initiatives have been launched to reach a larger segment of the population with preventive and therapeutic services. Special attention is given to combating chronic diseases like Hepatitis C and non-communicable diseases, as well as addressing pediatric conditions such as anemia and stunting. Over the past six years, a total of 14 health initiatives across all medical specialties have been launched, delivering 132 million medical services to approximately 93 million citizens, at a total cost of 32.2 billion EGP [2].

2-1- Current planning Standards for the allocation of healthcare service locations within urban communities

The planning rates for allocating health service sites in urban communities, prepared by the General Authority for Urban Planning in 2014, are based on a referral system. This two-way system connects primary healthcare units with hospitals. According to the family health model, the family doctor at the family health

unit serves as the first point of contact for health services. The subsequent four levels of healthcare require referrals through this system, except in emergency cases where patients can directly access secondary care services without a referral.

The patient's journey through the health system follows the various levels of the referral system. The first level, the family health unit, serves as the primary entry point for health services. From there, patients needing more specialized care are referred to either a family health center or a central hospital. This may lead to further referrals to a general hospital if additional care is needed, and if necessary, patients can be directed to specialized centers. Each level of referral provides feedback to the previous level regarding the cases it referred.

Additionally, doctors, nurses, and technicians at lower levels participate in ongoing training programs to enhance their professional skills. Specialists from higher levels also occasionally work with staff at lower levels to share their expertise in diagnosis and treatment.

The levels of medical service provision are interconnected within an integrated framework, which ultimately improves the delivery of health services across multiple levels and directions. These levels are linked to the planning rates for establishing health service sites in urban areas, considering the number of residents who will benefit from the services as well as the geographical range of the service's impact.[3] Table No. (1) presents the indicative planning rates for health services in urban communities. However, it is important to note that the guide to planning rates for health services does not include guidelines for service provision during epidemic outbreaks, as it was published prior to the COVID-19 pandemic.

Table No. (1) presents the indicative planning Standards for health services in urban communities [6]

Planning rates	Family Health Unit	Family Health Center	Central Hospital (B)	Central Hospital (A)	General Hospital
Number of population (thousand people)	5 – 20	20 – 40	Less 40	40 – 100	More 100
Type of urban	Residential neighborhood	Residential distract	small town	Medium city	Large city
Service Impact Area (Km)	2.5 – 3	5 – 10	10 – 20	20 – 40	40 – 50
Service access time (minute)	5	20	20	20	40

Source: Health Services Standards Guide – General Authority for Urban Planning – 2014

3- Health Service Distribution in Menoufia Governorate: An Evaluation Against Planning Standards.

To assess the effectiveness of applying health service planning standards in providing care to both existing and new urban communities, two cities were selected as case studies within Menoufia Governorate. Berket El Sabaa City was chosen as a model for existing urban communities, while Sadat City was selected as a model for new urban communities.

An overview of Menoufia Governorate reveals significant challenges in health resources. The governorate has 21 hospitals (5 general, 7 central, and 9 specialized), with a total of 2,477 beds. Consequently, the current bed-to-population ratio is 0.58 beds per 1,000 people, which is substantially lower than the Ministry of Health's approved standard of 2.7 beds per 1,000 people.

Regarding medical personnel, the governorate has 5,380 doctors, resulting in a rate of 12.5 doctors per 10,000 people. This rate is slightly below the average for urban governorates, which stands at 13.2 doctors per 10,000 people [4] .

3-1- Case Study (1): Berket El Sabaa City (Model for an Existing Urban Community)

Berket El Sabaa City is located in the northeastern part of Menoufia Governorate, 11 km from both Shibin El Kom and Tanta. The city contains one general hospital, two specialized hospitals, and one private hospital, providing a total of 226 beds. Based on planning standards, the population's share of beds is 4.1 per 1,000 people, indicating a theoretical surplus of 78 beds. Additionally, the city has one urban health center, 19 family planning units, and one blood bank. **Fig. 1**

Despite this apparent surplus of beds, a decline in the efficiency of health service provision is noted, raising questions about operational quality and the actual distribution of services, even with opportunities for private sector investment.

3-2- Case Study (2): Sadat City (Model for a New Urban Community)

Sadat City is located 93 kilometers northwest of Cairo on the Cairo-Alexandria Desert Road. It is a first-generation city with an economy based on industrial and agricultural activities. The city is renowned for its vast green spaces, which led the World Health Organization to classify it among the top ten industrial communities in the Middle East for its clean environment. **Fig. 2**

The city's health infrastructure includes one general hospital, two central hospitals, and three health units.

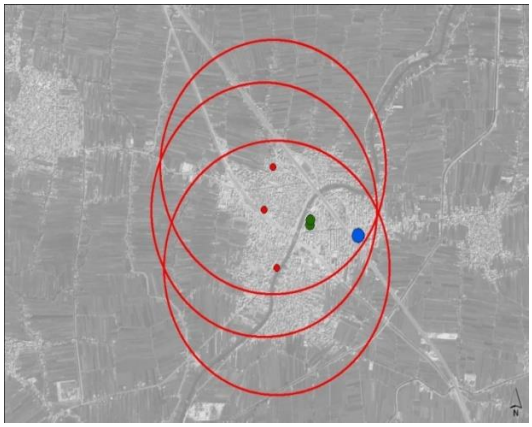

Fig. 1: Distribution of Current Health Services in Berket El Sabaa City, 2024 Source: The Researcher

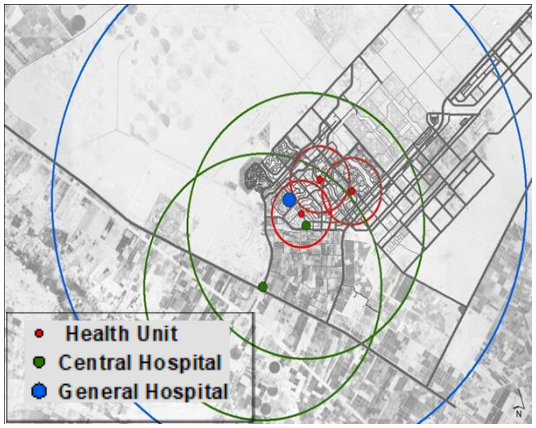

Fig. 2: Distribution of Current Health Services in Sadat City Source: The Researcher

Despite the lack of official data, an analysis of the response pattern reveals that measures were centralized and enforcement-oriented. The lack of systematic use of GIS is a strong indicator that the crisis management was reactive rather than proactive.

4- The World Health Organization's guidelines for Maintaining Essential Health Services

In response to the challenges posed by the COVID-19 pandemic, the World Health Organization (WHO) issued strategic guidance on June 1, 2020, aimed at enabling health systems to maintain essential services while effectively managing the crisis (World Health Organization, 2020). This framework is built upon several core principles designed to ensure flexibility, safety, and efficiency in healthcare delivery, which can be summarized as follows:[8]

4-1- Accessibility and Adaptability

The framework underscores the necessity of adapting service delivery infrastructure to meet emerging demands. This involves reconfiguring existing healthcare facilities, such as dedicating specific wards to COVID-19 patients while ensuring the safe continuity of other services. Furthermore, the guidance advocates for equipping alternative sites, such as schools or community centers, to expand the health sector's capacity. To alleviate pressure on facilities, the guidelines emphasize the critical role of remote health services (telehealth), such as telephone or online consultations, as a vital tool to reduce in-person visits and minimize transmission risks.

However, applying this principle to the case studies reveals a significant gap. The research found no documented evidence of reconfiguring existing health facilities or preparing alternative sites in either Berket El Sabaa or Sadat City during the COVID-19 pandemic, suggesting that this crucial aspect of preparedness was not practically implemented at the local level.

4-2- Safety and Infection Prevention

Safety and infection prevention measures are essential for the health system's response. Guidance requires strict physical separation between COVID-19 patient areas and other health services. Health facilities must improve capacity for screening, isolation, and triage, supported by basic safety measures like hand hygiene, physical distancing, and proper PPE use. While disinfection measures are in place, limited data on strict physical separation protocols within hospitals hampers the assessment of compliance.

4-3- Specialization and Service Distribution

To optimize resource utilization, the framework advocates for a strategic service distribution approach. It suggests designating specialized facilities for 24-hour acute care for severe cases while relocating non-essential services to less affected areas to maintain continuity. This strategy aims for equitable

health service distribution across regions to ensure equal access to care. However, evidence from two case studies indicated that specialization and service distribution principles were not applied during the pandemic, and health services operated within their traditional frameworks.

4-4- Flexibility in Response

The guidelines emphasize that health systems need flexibility to respond quickly to changing circumstances by redistributing resources and personnel based on the evolving epidemiological situation. They must modify service delivery models to meet shifting needs and plan for alternative transportation for patients during movement restrictions. The lack of changes in service delivery models in the two cities during the pandemic highlights a deficiency in institutional flexibility.y.

5- Discussion

The findings of this study highlight a critical need to shift from traditional health service planning to dynamic, data-driven methods. The gap between approved standards and real-world conditions in urban communities demonstrates that these standards alone do not ensure efficient and equitable service delivery.

Three key themes emerge from the analysis. First, technology and artificial intelligence are essential for enhancing decision-making. Health systems should utilize advanced analytical tools to predict needs, set priorities, and optimize resource allocation based on diverse health requirements.

Second, achieving equity in access to health services is paramount. Planning health facility locations must ensure geographical and social accessibility, especially in underserved areas. New urban developments offer a chance to create integrated health systems that promote equitable resource distribution and effective primary healthcare.

Lastly, building resilient health systems that can endure epidemics is necessary. This requires a robust information infrastructure, inter-sectoral coordination, and community engagement, with tools like Geographic Information Systems (GIS) and simulation exercises playing crucial roles.

The case of Berket El Sabaa, which reveals a surplus of beds but declining service efficiency, raises questions about non-planning factors, such as funding and management, that hinder effective health service delivery.es?

6- CONCLUSION

Based on the preceding discussion, this study proposes a set of recommendations aimed at improving the planning and delivery of health services, structured into short-term priorities and long-term strategic goals:

*** Short-Term Priorities**

- Activate Community Health Committees: Establish neighborhood-level health committees to enhance community participation and foster rapid collaboration during health crises.

- Strengthen Urban Epidemic Preparedness: Equip urban communities with shared information systems for assessing current health capacities and conduct regular simulation exercises to test emergency plans.
- Promote Multi-Sectoral Coordination: Develop effective coordination mechanisms and shared data platforms between health sector institutions and other relevant sectors to support immediate decision-making.

*** Long-Term Strategic Goals**

- Adopt Dynamic Planning Standards: Transition from static health service provision rates to flexible and adaptable planning standards that incorporate sustainability and green technologies. These standards must be integrated into strategic urban plans.
- Integrate Artificial Intelligence in Decision-Making: Leverage AI and machine learning applications to analyze health data, predict future needs, and optimize the distribution of medical resources, such as hospital beds.
- Implement Strategic Spatial Planning for Facilities: Ensure that the planning of health service sites in both existing and new cities prioritizes easy accessibility, with a strategic focus on high-population-density and underserved areas.
- Support Scientific Research: Encourage and fund research projects related to epidemics and effective response strategies by establishing strategic partnerships with academic and research institutions.

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