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REVIEW

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The health system in Syria (2000–2024): assembling the pieces of a fragmented system—A scoping review

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Abstract

This study provides a detailed overview of Syria's health system from 2000 to 2024 by synthesizing existing literature and data. Its goal is to inform the health sector recovery plan following recent political changes in Syria, detailing the health system's characteristics and evolution on the basis of the WHO's conceptual framework. A scoping review was conducted following Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines. Data sources included PubMed, MEDLINE, Scopus, Google Scholar, grey literature and government reports. The analysis identified service delivery, financing, and governance as the most frequently discussed aspects of the health system. It revealed a distorted health system that retained aspects of the Semashko model whilst also incorporating elements of liberalization from the 2003 modernization program. The study underscores major challenges, including the politicization of healthcare, workforce shortages, fragmented financing, and disparities in access to healthcare services. The findings indicate that the Syrian health system has been characterized by centralized governance, inconsistent financing strategies, a fragmented health information system, and a growing dependence on the private sector. The post-conflict recovery phase offers a chance to rebuild a more equitable and resilient health system. Policymakers are urged to consider necessary reforms to the health system recovery plan in Syria.

Introduction

Syria is a low-income country that has been witnessing a protracted conflict since 2011 after protests against the political regime and former president Bashar Al-Assad [1]. Many authors and politicians claimed that the first years of Al-Assad's rule, who inherited it from his father in 2000, witnessed systematic reforms spread over multiple sectors and areas of life, including the health system. Thus, it could be assumed that this era (2000 and afterward) differs from the precedent one during the father's rule, especially after the liberalization of the finance sector for the first time since 1963 and the appearance of the private sector [2, 3]. On the contrary, several papers claimed that these reforms were neither fundamental nor inclusive, citing facts of the increased poverty level as well as the vanishing of the middle class and the appearance of rich and poor classes, highlighting that these reforms did not include political rights since people were burdened with a vicelike grip [4, 5]. The debate about reforms extended to the health system, which witnessed remarkable changes, as documented by many authors. However, many others criticized these changes as merely a process of privatization restricted to a delegation of non-strategic responsibilities and accountabilities to the private sector without giving up sovereignty [5].

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Dewachi et al. contend that providing healthcare services functioned as a mechanism through which the state consolidated its social and political legitimacy, reinforcing an authoritarian one-party system. By monopolizing healthcare, the government extended its capacity to regulate and control the population beyond coercive measures. Simultaneously, the availability of such services fostered a sense of citizenship and reinforced public recognition of state authority [6].

These factors, inspired by political changes in neighbouring countries, resulted in peaceful protests against the political system, which developed into an internal armed conflict and involvement of international powers. The geopolitics in the country witnessed remarkable changes between 2011 and 2024 [7]. However, the most striking change that remains engraved in the history of Syria and the memory of the Syrians was the overthrow of former president Al-Assad on 08/12/2024 after a brisk military advance of the armed opposition groups from the north-west to the capital, Damascus, and the formation of a caretaker government [8].

The protracted conflict in Syria resulted in a fragmented health system along with geopolitics changes and military control dynamics, with three regions controlled by different sides. The term "national health system" in a conceptual sense has traditionally referred to the structure administered by the central government in Damascus [9, 10]. According to the World Bank data, the national expenditure on the health sector as a share of the gross domestic product (GDP) increased between 2000 and 2003, the first 4 years of Al-Assad's rule, from 4.55 to 5.12% (US$55 to US$61 per capita). However, this share decreased gradually to 3.05% by 2012 (Figs. 1 & 2). These data indicated a general decline in national health expenditure, complying with claims that the national reforms were not systematic or fundamental. Data beyond 2012 is scarce due to the conflict, which has disrupted data collection and reporting mechanisms. Paradoxically, the public health indicators followed an opposite trend. The public health indicators showed a chronologically significant improvement [11], such as life expectancy at birth and maternal, infant, and under-five mortality rates [12]. These figures are inconsistent with the aforementioned economic performance metrics regarding the national expenditure on health, as shown in Figs. 1 and 2.

The conflict has severely impacted Syria's economy, leading to contractions in GDP and deteriorations in public welfare. As of 2022, poverty affected 69% of the population, with extreme poverty reaching 27% [13]. In general, it could be argued that the health system, which became increasingly politicized during the crisis,

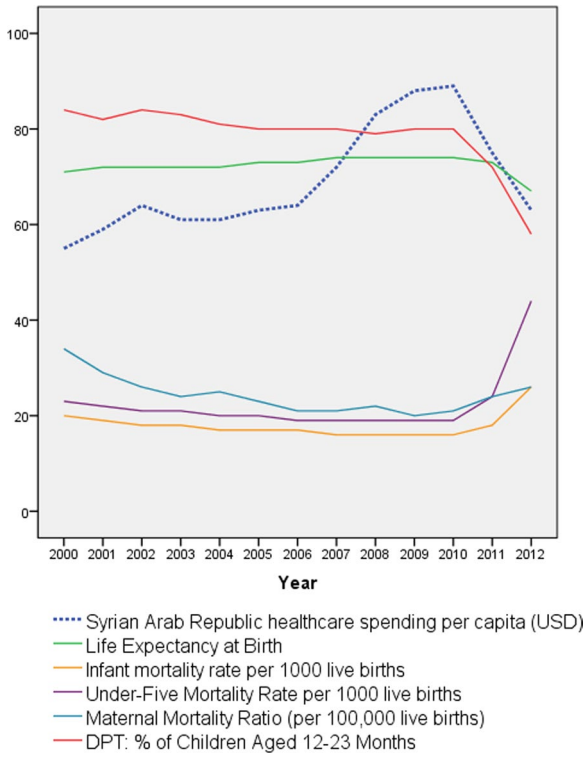

Fig. 1 Healthcare spending per capita US$ in Syria between 2000 and 2012 (blue-dotted line) compared with public health indicators. The data indicate a gradual increase in spending from 2000 to 2006, followed by a sharp rise between 2006 and 2010. However, this rise was not consistent with the GDP% share (Fig. 2), or most public health indicators which remained stable or increased, except for the DPT coverage and life expectancy at birth (Source: World Bank Data)

was not amongst the top priorities of the Syrian government [14]. Additionally, scientific research, particularly about the national health system, has been limited, which resulted in a lack of reliable references that are highly sought at this point in time with a new chapter of civil and political life in Syria and anticipated system and infrastructure recovery [15]. Therefore, this scoping review aims to synthesize and critically assess the model and structure of the health system in Syria during the period 2000–2024. Given the scarcity of contemporary studies reflecting the evolving political landscape, this review focusses on analysing the historical and transitional characteristics of the national health system to provide a foundational baseline for informing strategic decision-making during the early recovery and reconstruction phases. By understanding the system's strengths, weaknesses and distortions, policymakers can better design resilient and inclusive health system reforms tailored to the post-conflict context.

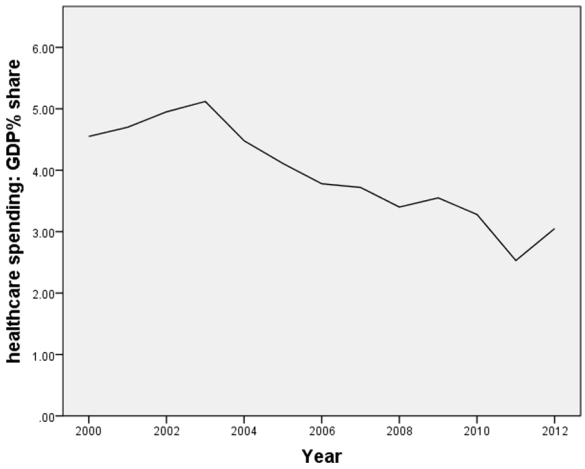

Fig. 2 Percentage of GDP allocated to healthcare spending from 2000 to 2012. The data show a gradual increase in the early 2000s, peaking around 2003, followed by a steady decline from 2004 onward, reaching its lowest point around 2011. This trend suggests a reduction in the governmental investment in the health sector overtime, especially in 2011 due to the crisis. Compared with Fig. 1, the governmental expenditure per capita on the health system was not proportional to the overall GDP (Source: World Bank Data)

Methods and analysis

The conceptual framework for this study is based on the WHO's six building blocks of the health system: service delivery, health workforce, health information systems, access to essential medicines, health financing and leadership and governance [16]. Consequently, a deductive approach was employed, utilizing this framework to structure the research, with the building blocks serving as thematic categories for analysis. The list of definitions of the health system building blocks used for thematic analysis is available in the supplementary documents [17]. The stakeholder perspectives were explored in the qualitative studies to complement the findings. The literature review was undertaken in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines. A completed PRISMA-ScR checklist, developed by Tricco et al. [18], is available with supplementary documents. The research protocol was registered on the Open Science Framework (OSF) Database of Systematic Reviews (https://doi.org/10.17605/OSF.IO/R4B37).

Eligibility criteria

Studies were considered for inclusion if they focussed on the national health system in Syria, specifically addressing populations residing under the administration of the central government in Damascus. The review considered both peer-reviewed and grey literature that examined at least one of the six WHO health system building blocks. Only publications in English or Arabic were included. Studies were excluded if they focussed solely on Syrian refugees, addressed health systems in regions that were out of central government control during the conflict or fell outside the 2000–2024 timeframe. This period was selected on the basis of the assumption that substantial systemic shifts in Syria's health system began in 2000 [19]. A detailed summary of inclusion and exclusion criteria is presented in Table 1.

Information sources and search strategy

A comprehensive literature search was conducted on PubMed, MEDLINE, Scopus and Google Scholar databases. Due to the lack of peer-reviewed publications, grey literature and government reports were included. Additionally, reference list screening and hand searching were performed to identify additional relevant studies. The detailed search strategy, including key search terms and queries, is provided in the supplementary documents.

Table 1 Inclusion and exclusion criteria for studies on the Syrian health system (2000–2024)

Criteria type	Inclusion criteria	Exclusion criteria
Population	Studies addressing the health system within Syria's borders	Studies focussing exclusively on Syrian refugees, or Syrian populations who were in regions out of the central government control, or Syrian populations outside Syria
Geographic scope	Health services and policies under the central government in Damascus	Studies examining health systems in non-government-controlled areas during the conflict
Publication type	Peer-reviewed articles, grey literature, government reports, policy briefs	Studies lack relevance to national health system structure or are based on nonsystemic issues
Language	English and Arabic	Publications in other languages
Timeframe	Published between 2000 and 2024	Studies published before 2000 or not relevant to the defined study period
Relevance	Studies addressing at least one of WHO's six health system building blocks	Studies do not address any core health system component or lack system-level focus

Analysis protocol and quality check

Rayyan software was utilized to manage the screening process. Two authors were involved in conducting a blinded screening of the search results. Any discrepancies or undecided articles were resolved through discussion amongst other authors. Quality and bias were assessed at a study level using the QualSyst system for quantitative and qualitative studies [20]. The final list of included articles was uploaded to QDA Miner software (available on PROVALIS: https://provalisresearch.com/), where coding, thematic analysis and synthesis were performed. Data analysis documents are available on the Mendeley repository website: https://data.mendeley.com/datasets/456ypf72fv/1.

Results

The search identified 386 articles, from which 6 duplicates were removed. The titles and abstracts of the remaining 380 studies were screened to determine their relevance to the research topic and alignment with the inclusion criteria. As a result, 306 studies were excluded. The remaining 74 records underwent full-text screening, during which 54 studies were excluded for not meeting the inclusion criteria (for example, not discussing the health system from the WHO building blocks perspective, about the health system in areas out of government control or about Syrian refugees). Figure 3 shows the PRISMA-ScR diagram describing the screening process [21]. Ultimately, 20 studies were included in the final analysis [22–41]. The included studies' title, design and year of publication are presented in Table 2.

Thematic analysis showed that health service delivery, health financing and health governance were the building blocks mostly addressed in the reviewed articles, respectively. The other themes were mentioned less overall or within the records (Table 3).

The studies predominantly focussed on the functionality and challenges of health service delivery, particularly in terms of accessibility and quality of care. Several studies assessed disparities in healthcare access, with some highlighting inequities in service provision across different regions of Syria before and during the conflict. Additionally, multiple studies discussed the role of financing reforms and their impact on the accessibility of healthcare services, with particular emphasis on out-of-pocket expenditures and the financial burden on households. The governance aspect was addressed in studies that explored the impact of policy decisions, structural reforms and external factors such as sanctions on the overall performance of the Syrian health system. Workforce-related challenges were highlighted in studies discussing the migration of healthcare professionals, shortages of qualified personnel and the increasing reliance on unregulated private-sector employment. Studies addressing access to essential medicines emphasized the availability of pharmaceuticals, the role of sanctions in limiting imports, and the impact of the conflict on supply chain disruptions. Health information systems were the least addressed theme, with limited studies discussing data collection, health reporting mechanisms, and the reliability of existing healthcare statistics.

Service delivery and access to healthcare

All the studies discussed service delivery and access to health services in Syria before and during the conflict [22–41]. The health system prior to 2011 was highly centralized, with most well-equipped hospitals and specialized medical centres concentrated in urban areas such as Damascus, Aleppo, Homs and Latakia, whilst rural and remote regions had fewer healthcare facilities and struggled with shortages of medical personnel and essential medicines [22, 33]. These disparities contributed to significant differences in health outcomes, particularly maternal and child health indicators, which were generally worse in underserved areas [26, 27]. Additionally, certain specialized health services, including cancer diagnosis and treatment, were predominantly concentrated in major urban cities such as Damascus, Aleppo and Latakia [41].

Despite these regional inequalities, Syria had a relatively extensive public healthcare network before 2011, with free or low-cost services available in public hospitals and primary healthcare centres [30]. However, increasing out-of-pocket expenditures and the growing role of private healthcare providers created financial barriers to access, particularly for lower-income populations [32]. Studies also indicated that whilst public healthcare facilities were accessible in theory, long waiting times, inconsistent service availability and an overburdened system often deterred patients from seeking care in public hospitals [38, 39]. Although primary healthcare centres were meant to be the first point of contact for healthcare access, underfunding, shortages of trained personnel and inefficient referral systems led many patients to bypass primary healthcare in favour of overcrowded public hospitals or costly private clinics [30]

The quality of healthcare services in Syria varied widely between public and private providers. Public hospitals, despite being widely used, faced significant limitations in infrastructure, staffing and resource availability, which impacted the quality of care [32, 33, 40]. Several studies reported that public healthcare facilities were often overcrowded, with patients experiencing long wait times, insufficient diagnostic capabilities and inconsistent drug supplies [28, 37]. In contrast, private healthcare facilities were perceived to offer higher-quality care due to better

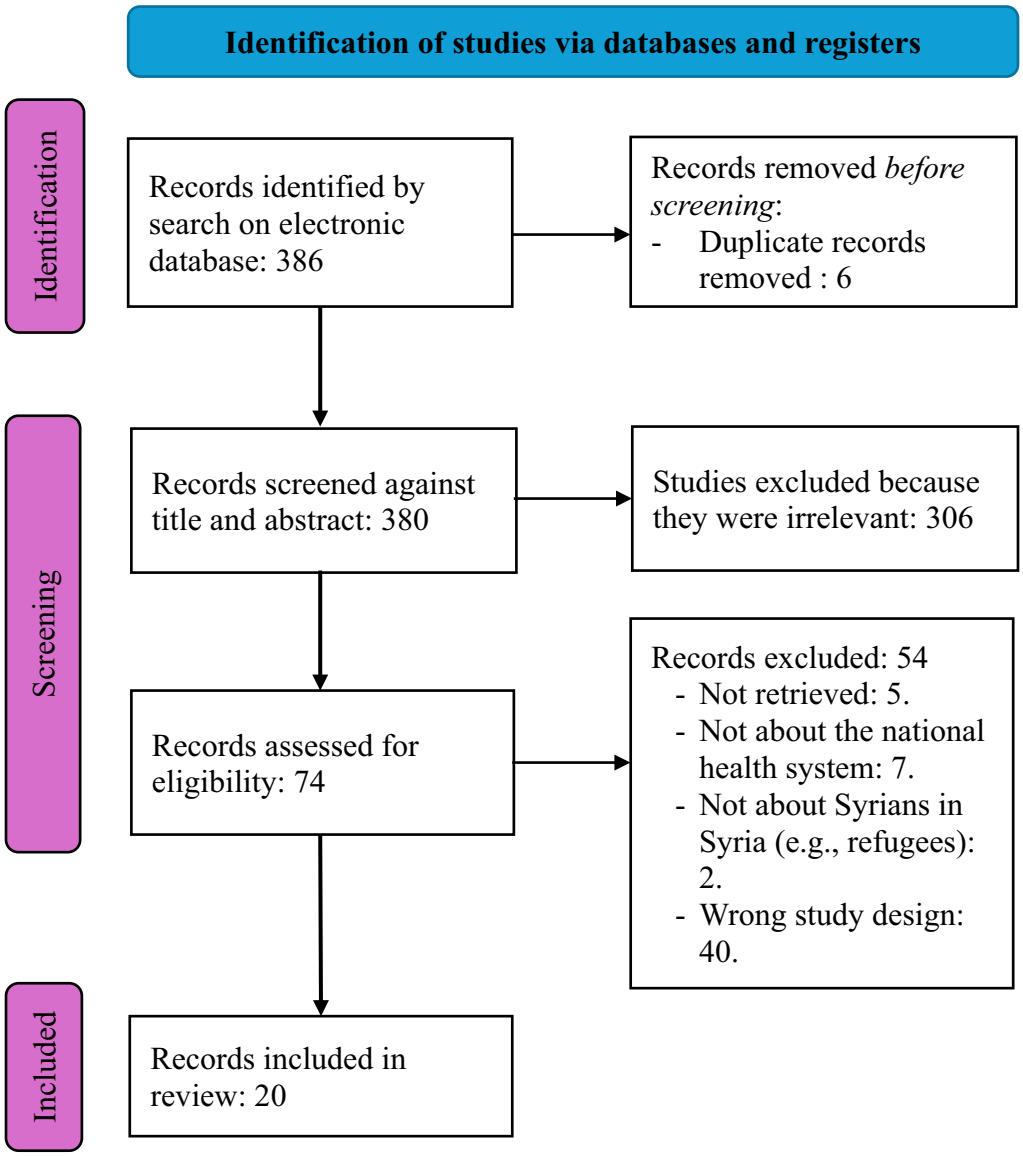

Fig. 3 PRISMA flowchart showing the studies identified and the process of inclusion and elimination

infrastructure, shorter waiting times and a greater availability of specialized services. However, the cost of private healthcare services was prohibitive for many Syrians, reinforcing socioeconomic inequalities in healthcare access [30, 32]. Private healthcare providers also operated with varying degrees of regulation, leading to concerns about inconsistent medical standards and potential ethical violations [29, 36].

The public healthcare network included large general hospitals, university hospitals and speciality centres, but many facilities suffered from underfunding, outdated equipment, and a lack of modern medical technologies [28, 38]. About 80% of the hospital bed capacity was in public hospitals. However, these hospitals were often underutilized due to a lack of trust in the quality of care [27, 35]. A national health accounts report (2003) indicated that government funding for healthcare was largely concentrated on hospital-based services, with limited investment in preventive and primary care [33]. This led to a hospital-centric health system, where secondary and tertiary care facilities were overburdened with patients seeking treatment for conditions that could have been managed at the primary care level [23, 28].

The role of the private sector in health service delivery expanded significantly following the neoliberal economic reforms of the early 2000s. The liberalization of

Table 2 Title, author, year of publication and aim of the included papers in the scoping review analysis

Author/s	Year	Title	Aim of the study	Type of the paper
Mhd Nour Audi, Kevin M Mwenda, Guixing Wei, Mark N Lurie	2022	Healthcare accessibility in preconflict Syria: a comparative spatial analysis	Establish an understanding of preconflict status of health inequities through the lens of spatial accessibility to hospitals	Comparative access analysis research article
Lena Basha, Hamza Ahmed, Mohamed Hamze, Amaar Awais Ali, Fares Alahdab, Manar Marzouk, Richard Sullivan, Aula Abbara	2024	Cancer and Syria in conflict: a systematic review	Identify available literature that describes the burden of cancer and the provision of oncology services in Syria to identify gaps in literature and services	Systematic literature review
Ziyad Ben Taleb, Raed Bahelah, Fouad M. Fouad, Adam Coutts, Meredith Wilcox, Wasim Maziak	2014	Syria: health in a country undergoing tragic transition	Provide a readily informative record to understand what Syria and its population are going through during the conflict and how it reflects on their wellbeing and health needs	Literature review
Kasturi Sen, Waleed Al-Faisal, Yaser AlSaleh	2012	Syria: effects of conflict and sanctions on public health	Discuss the gains in health status made due to the efforts of public health professionals and examine the possible consequences of sanctions and crisis on the future of public health delivery in Syria	Literature review
Mohamad Saleem Anis	2022	In Syria, unqualified people are renting pharmacists' licenses to open drugstores: a phenomenon that threatens public health	Address the public health risks of unqualified individuals renting pharmacists' licenses in Syria	Editorial
Brianne Mcgonigle Leyh, Marie Elske Gispen	2018	Access to medicines in times of conflict: overlapping Compliance and accountability frameworks for Syria	Presents a comprehensive analysis of how international legal frameworks can be applied and enforced to improve access to medicines in conflict zones such as Syria	Legal framework analysis article
Hosam E Matar, Muhammad Q Almerie, Mohamad Alsabbagh, Muhammad Jawoosh, Yara Almerie, Asma Abdulsalam, Lelia Duley	2010	Policies for care during the third stage of labour: a survey of maternity units in Syria	Investigate policies for care during the third stage of labour compared with the available evidence	Cross-sectional survey
Hyam Bashour, Raghda Hafez, Asmaa Abdulsalamc	2005	Syrian women's perceptions and experiences of ultrasound screening in pregnancy: Implications for antenatal policy	Explore women's views, perceptions, and experiences of ultrasound imaging in pregnancy	Exploratory-descriptive qualitative research article
Lilas Allahham, Sulaiman Mouselli, Mihajlo Jakovljevic	2022	The quality of Syrian healthcare services during COVID-19: a HEALTHQUAL approach	Test the quality of the health services during the coronavirus disease 2019 (COVID-19) pandemic and compare the quality of health services between public and private hospitals	Quality analysis research article
Lina Kafi, Hammoda Abu-Odah, Qin Xu	2024	Experiences and needs of colorectal cancer survivors in resource-limited countries: a qualitative descriptive study in Syria	Investigate the needs and experiences of colorectal cancer survivors within the Syrian context	Exploratory-descriptive qualitative research article
Lujain Sahloul, Feras Bouri, Eman Bsso, Aya Saleh, Ebaa Darwish, Lamiaa Yaseen, Ammar Muhamed Mustafa, Taher Hatahet	2022	Risk assessment of the continuity of essential medications for low socioeconomic patients in Syria: a case study of diabetes mellitus	Examines monthly prescriptions for patients from low socioeconomic backgrounds and assesses the availability of oral antidiabetic drugs in various Damascus pharmacies to evaluate the risk of medication shortages	Cross-sectional survey

Table 2 (continued)

Author/s	Year	Title	Aim of the study	Type of the paper
Hyam Bashour, Mayada Kharouf, Jocelyn DeJong	2021	Childbirth experiences and delivery care during times of war: testimonies of Syrian women and doctors	Highlight the experience of childbirth and delivery care as described by women and doctors at times of severe violence affecting Damascus city during the period 2012–2014	Secondary analysis of qualitative data
Rima Mourtada, Hyam Bashour, Fiona Houben4	2021	A qualitative study exploring barriers to adequate uptake of antenatal care in preconflict Syria: low cost interventions are needed to address disparities in antenatal care	Explore barriers to women's adequate uptake of antenatal care (ANC) and regional differences in uptake	Qualitative research study
Rima Mourtada, Christian Bottomley, Fiona Houben, Hyam Bashour, Oona M, R. Campbell	2019	A mixed methods analysis of factors affecting antenatal care content: a Syrian case study	Explain variation in the adequacy of ANC content between two governorates in Syria; Aleppo and Latakia	Mixed approach analysis
Balsam Ahmad, Fouad M. Fouad, Madonna Elias. Shahaduz Zaman, Peter Phillimore, Wasim Maziak	2014	Health system challenges for the management of cardiovascular disease and diabetes: an empirical qualitative study from Syria	Explore the anatomy of the health system prior to the crisis in 2011 and its effectiveness in managing two key noncommunicable diseases; cardiovascular diseases and diabetes mellitus	Literature review
Mihajlo Jakovljevic, Sanaa Al ahdab, Milena Jurisevic, Sulaiman Mouselli	2018	Antibiotic resistance in Syria: a local problem turns into a global threat	Examination of the issue of antibiotic resistance within Syria and the systemic and practice-oriented challenges that contribute to the problem	Perspective article
Kasturi Sen, Waleed al Faisal	2012	Syria: neoliberal reforms in health sector financing: embedding unequal access?	Examines the effects of neoliberal economic reforms on the health sector financing in Syria	Literature review
Kasturi Sen, Waleed Al-Faisal	2013	Reforms and emerging noncommunicable disease: some challenges facing a conflict-ridden country-the case of the Syrian Arab Republic	Evaluate how health sector reforms, compounded by the conflict and international sanctions, have impacted the management and prevalence of NCDs in Syria	Literature review
Mania Mershed, Reinhard Busse, Ewout van Ginneken	2012	Healthcare financing in Syria: satisfaction with the current system and the role of national health insurance-a qualitative study of householders' views	Investigate the feasibility of introducing a national health insurance system in Syria	Qualitative research study
Mahmoud Dashash, Roula Kaderi, Mohammad Hadi Fadda, Detlef Schwefel	2006	National health accounts 2003 for Syria: a graphical overview	Describe and detail the health expenditure and uses of health funds in Syria for the year 2003	Descriptive report

Table 3 Distribution of themes across all the records

Theme	# of cases	% of cases
Service delivery	20	100
Workforce	8	40
Health information system	8	40
Access to essential medicine and supplies	8	40
Financing	13	65
Governance	13	65

the healthcare market under the Health System Modernization Program (HSMP) allowed private hospitals, clinics and pharmacies to proliferate, particularly in major urban centres [31, 32]. Whilst this expansion increased the availability of healthcare services, it also introduced regulatory challenges, such as inconsistencies in licensing, quality control and pricing [29, 36]. The private sector also played a key role in the provision of pharmaceuticals, with many medications imported and sold at high prices, making essential medicines inaccessible for low-income groups [29, 37, 42].

Several articles have discussed the HSMP, criticizing its impact on equitable access to essential health services in Syria. This program was introduced in Syria as part of the broader neoliberal economic reforms initiated in the early 2000s, with the goal of improving healthcare efficiency, quality and accessibility. Supported by the European Union (EU) and the German Technical Cooperation Agency (GTZ), the HSMP sought to reform health financing, expand public–private partnerships and introduce health insurance schemes to reduce the financial burden on the state whilst increasing private sector participation [28, 30, 33]. Whilst these reforms aimed to enhance service delivery and efficiency, their impact on access to healthcare was mixed. On one hand, the HSMP facilitated the growth of private healthcare providers, leading to an increase in the availability of specialized services, particularly in urban centres. On the other, the shift towards a more market-driven health system resulted in rising out-of-pocket expenditures for patients, widening health inequalities, and limiting access for low-income populations who could not afford private services [31, 32]. Additionally, the introduction of user fees in some public hospitals reduced the affordability of healthcare for vulnerable groups, contradicting the original goal of improving universal access [28, 33].

Health workforce

In total, eight studies discussed the health workforce situation in Syria before and during the conflict period [23, 27, 28, 34, 36, 38, 40, 41]. Before 2011, Syria had a growing number of healthcare professionals, but their distribution was uneven, favouring urban centres over rural and underserved areas [22, 27, 34]. The majority of doctors, nurses and specialists were concentrated in the major cities, whilst rural areas, particularly in eastern and northern Syria, suffered from chronic shortages of medical personnel [23, 27]. The centralized health system required newly graduated doctors to complete mandatory service in rural areas for 2 years before securing permanent positions in urban cities [34, 38]. However, this policy had limited effectiveness, as many physicians sought to leave rural posts at the earliest opportunity, often migrating to private sector jobs or leaving the country for better opportunities abroad [28, 34]. Additionally, specialists in fields such as oncology, cardiology and anaesthesiology were scarce in government hospitals, leading to long wait times and referral delays for critical services [23, 41]. After 2011, these workforce distribution challenges worsened as many healthcare workers fled conflict-affected areas, leaving entire regions without sufficient medical staff [34].

Syria had a well-established medical education system, with government-funded universities in Damascus, Aleppo, Latakia, Homs and other major cities training large numbers of doctors and nurses [23, 34]. However, limited postgraduate training opportunities and outdated curricula posed challenges to workforce development. Medical speciality in Syria was driven by norms and market demand. Therefore, the health sector in Syria suffered from a shortage in certain specialities [23, 34, 41]. Midwives were responsible for providing community and home-based services, such as antenatal and postnatal care, and conducting normal vaginal births [38]. Nursing and midwifery education also faced significant barriers, as low salaries, poor working conditions and limited career advancement deterred many from pursuing long-term careers in the field. As a result, nursing shortages became a persistent issue, especially in the field of community-based services and public hospitals, where staffing levels were often insufficient to provide adequate patient care [27, 34, 40].

Public sector healthcare workers faced numerous challenges, including low salaries, excessive workloads, workplace violence due to poor protective regulations and bureaucratic inefficiencies [34, 40]. Government-employed doctors and nurses earned significantly less than their counterparts in the private sector, leading many to work multiple jobs or seek employment abroad [28, 34]. A common trend amongst public sector physicians was to split their time between government hospitals and private clinics, often prioritizing higher-paying private patients over public-sector responsibilities. This dual practice system created conflicts of interest, as some doctors reportedly diverted patients from public

hospitals to their private clinics, further reducing access to care for lower-income populations [30, 34].

In addition to financial concerns, poor working conditions contributed to low job satisfaction and burnout amongst healthcare workers [27]. Public hospitals were often understaffed and overburdened, leading to long shifts, inadequate support staff and limited access to modern medical equipment. These factors made public sector employment increasingly unattractive, contributing to staff shortages and high turnover rates [28, 41]. A key workforce challenge in Syria was physician and nurse migration, driven by low salaries, limited career opportunities, and political instability. Many healthcare professionals sought employment in Gulf countries and Europe, where they could earn substantially higher wages and access better training programs [23, 28, 34]. This outflow of skilled professionals exacerbated shortages in key medical specialities, particularly in public hospitals [41].

The HSMP played a significant role in expanding private sector opportunities for healthcare workers, offering higher salaries and better working conditions compared with public hospitals. Whilst this contributed to improved service availability in urban areas, it also led to a brain drain from the public sector, further weakening state-run healthcare institutions [30].

Health information system

In total, eight studies addressed aspects of the health information system in Syria [22, 23, 27, 28, 30, 33, 35, 42]. Before the conflict, the health information system in Syria was highly centralized and poorly funded, with data collection primarily managed by the Ministry of Health (MoH) and affiliated institutions [30, 33, 35]. The National Health Accounts (2003) report highlighted the government's efforts to improve data collection and financial tracking, yet it also revealed gaps in data accuracy and consistency. The health information system relied heavily on administrative reporting, with hospitals and clinics submitting periodic reports to the MoH. Nevertheless, these reports were often incomplete, outdated or inconsistent due to inefficiencies in data management and a lack of standardized reporting formats [33]. The role of the health information system in Syria was restricted to providing information about service delivery and number of patients. Information regarding the functionality and distribution of healthcare facilities in Syria was notably scarce. In some governorates, the health information system was used to track logistics and medicine procurement [22, 33].

One of the major challenges was the absence of a nationwide electronic health records (EHR) system, leading to manual data entry and storage, which increased the potentiality of reporting errors, duplication and data loss [30]. Additionally, private healthcare providers were not fully integrated into the national health information system, limiting the government's ability to track comprehensive health indicators and the utilization of healthcare services outside the public sector [27, 30, 33]. The lack of coordination between public and private healthcare institutions created gaps in surveillance and health statistics, particularly for noncommunicable diseases and chronic illnesses, which were becoming an increasing burden on the health system [28, 30].

Despite efforts to modernize the health sector, governance and coordination of health information system in Syria remained weak. The MoH and other government agencies lacked a practical framework for coordinating data management across different healthcare institutions, leading to duplication of efforts, inefficiencies, and gaps in health surveillance. Furthermore, the absence of independent health data auditing mechanisms meant that reported statistics were rarely validated for accuracy or reliability, making it difficult for policymakers to develop evidence-based strategies [30, 33].

The HSMP aimed to improve health governance, including health information system reforms, by introducing new data management policies and electronic health initiatives [30]. However, limited financial investment, bureaucratic inefficiencies, and limited capacity in data management and health information system usage prevented the full implementation of these reforms. As a result, health information remained fragmented, poorly managed and largely inaccessible to policymakers and researchers [33, 35]. Additionally, the lack of transparency and political influence over health data further undermined the effectiveness of the health information system. Health reports were sometimes manipulated to reflect favourable outcomes, particularly in maternal and child health indicators, which made it difficult to assess the true performance of the health system [30]. These governance challenges persisted in the post-2011 period, as different authorities took control over health administration in opposition-held and government-controlled areas, leading to parallel and uncoordinated health information system frameworks [42].

A major barrier to an effective health information system in Syria was the outdated technological infrastructure supporting data collection and reporting [30, 33]. Most health records were paper-based, and few hospitals had computerized systems for storing and sharing patient data [30, 35]. Even within government hospitals, data management systems varied significantly, leading to inconsistencies in reporting and inefficiencies in data retrieval [33].

Pharmaceuticals and medical supplies

A total of eight studies examined access to essential medicines and supplies in Syria before and during the conflict period [23, 27–30, 33, 35, 42]. Before the conflict, Syria had a well-established pharmaceutical industry, covering 90% of domestic medicine needs through local production. The country was home to more than 70 pharmaceutical factories, mainly concentrated in Aleppo, Damascus and Homs, which produced generic medications for chronic and infectious diseases [28, 29, 35]. These medicines were generally affordable, allowing Syria to maintain one of the lowest drug costs in the Middle East [28, 30, 33]. However, gaps in supply chain management and distribution mechanisms led to frequent disruptions in medicine availability, particularly in rural areas [27, 33]. Whilst urban centres had well-stocked pharmacies and hospitals, many remote regions suffered from inconsistent drug supply, often requiring patients to travel long distances to access essential medicine [42].

Despite its strong domestic pharmaceutical industry, the health financing structure in Syria placed a heavy financial burden on individuals, particularly for outpatient medications. Out-of-pocket spending on medicines accounted for a significant portion of total healthcare costs, as public insurance coverage for pharmaceuticals was limited [30, 33]. Many essential drugs were subsidized by the government, but higher-cost and specialized treatments, such as cancer and chronic disease drugs, required direct payment, which created barriers to access for low-income populations [23, 27, 30, 42].

Regulation of medicines and medical supplies in Syria was overseen by the MoH, which approved new pharmaceuticals, monitored quality and set price controls. However, the regulatory system faced numerous weaknesses, including inconsistent enforcement, lack of transparency, issues related to quality, and inadequate monitoring of private-sector activities [28, 30, 33]. One of the most significant regulatory challenges was the proliferation of unlicensed drug sales and informal pharmaceutical markets. Some private pharmacies and distributors were not obedient to price regulations, selling higher-cost imported medications at unregulated prices, whilst others engaged in fraudulent practices [29]. Additionally, physician–pharmaceutical industry relationships often led to prescription biases, where doctors favoured certain brands or higher-cost drugs due to financial incentives rather than medical necessity [29, 30].

The private sector played an increasing role in medicine distribution in Syria, particularly after the government introduced market-oriented health reforms. The HSMP encouraged private investment in pharmaceuticals, leading to a rapid expansion of private pharmacies, wholesalers and distributors, which led to an increase in drug availability in urban centres. Nevertheless, it deepened socioeconomic disparities, as private-sector medicines were often more expensive and primarily accessible to wealthier populations [30, 33]. A major concern regarding private-sector involvement was the lack of effective oversight and accountability. One of the articles indicated that unqualified individuals were renting pharmacist licenses to operate drug stores, undermining medicine safety and professional standards. Additionally, private distributors had considerable influence over drug pricing, leading to frequent fluctuations in medicine costs [30].

Health financing

A total of 13 studies discussed aspects of health financing in Syria between 2000 and 2024 [22, 23, 27–35, 40]. Before the conflict, the Syrian health system was primarily state-funded, with the government playing a dominant role in financing public healthcare services [32, 33]. According to national health accounts, the government's health expenditure as a share of GDP increased from 4.55% in 2000 to 5.12% in 2003, reflecting an initial effort to enhance healthcare financing during the early years of Bashar Al-Assad's presidency [33]. However, this trend did not continue. From 2004 onwards, health expenditure gradually declined, reaching 3.05% of GDP by 2012, indicating a decreasing state commitment to public healthcare financing [30, 33]. Although other studies reported slightly varying figures for GDP, the general idea was consistent and indicated a substantial reduction in government expenditure on the health system [34].

Health services and medication offered by public health centres and hospitals were provided at no cost. However, after introducing the HSMP, public hospitals increasingly charged fees for services, deviating from the Semashko model of free healthcare provision [22, 32, 40]. One of the most significant consequences of reduced public healthcare funding was the increased reliance on out-of-pocket expenditures by Syrian households [29, 31, 32, 40]. By 2008, out-of-pocket spending constituted approximately 61% of total health expenditures, compared with 59.6% in 2000, highlighting a growing financial burden on individuals [32, 34]. These expenses were mainly directed towards private healthcare services, medications and informal payments in public hospitals [29, 31]. The included studies indicate that low-income populations were disproportionately affected by rising out-of-pocket costs, often leading them to delay or hinder necessary medical care and affecting the quality of services. The cost of pharmaceuticals was a particularly heavy burden, with essential medications becoming increasingly expensive due to reliance on private importers and weak price regulation [29, 32].

The parallel health systems under the authority of other ministries implied fragmentation in the health system financing. The Ministry of Finance (MoF) played a central role in budget allocation for the health sector in Syria, determining the annual financial resources allocated to the MoH and other ministries [22, 32, 33]. The MoF prioritized hospital-based services and curative care, whilst primary healthcare and preventive programs received less funding, leading to disparities in resource distribution. [30, 31]. The health system budget was mainly channelled to the big cities in Syria and to urban settings, creating geographical disparities and low investment in many neglected governorates [23].

In contrast to the centrally allocated budget of the MoH, hospitals operated by other ministries, such as the Ministry of Higher Education (MoHE), Ministry of Social Affairs and Labor (MoSAL) and Ministry of Defense (MoD), received independent or semi-independent health funding. The largest and the most well-equipped hospitals were managed by MoHE, which operated 14 hospitals concentrated in the main cities of Damascus, Aleppo and Latakia. In the late 2000s, several of these hospitals introduced private departments for cost-sharing health services, paid by patients able to afford this expense, as a strategy to reduce waiting times [22, 40]. The Ministry of Defense (MoD) budget, including its health sector funding for military hospitals and medical services, was largely independent of the MoF and was allocated directly by the central government. Unlike the MoH and other ministries, which relied on MoF-approved budgets, the MoD had a separate funding stream, often receiving preferential financial allocations that were not subject to the same budgetary constraints as civilian healthcare services [30, 32]. This independent financial structure allowed the MoD hospitals to maintain better infrastructure, medical supplies and workforce conditions compared with public civilian hospitals, contributing to inequities in healthcare quality and access [30].

The absence of comprehensive social health insurance left most Syrians without financial protection against catastrophic health expenses. Syria did not implement a universal health insurance system before the conflict. Instead, small-scale, fragmented insurance schemes covered only limited segments of the population (less than 5% of the whole population by the end of 2020), such as public sector employees and members of certain professional associations [30, 32, 40]. The absence of a national risk pool and the dominance of out-of-pocket payments meant that insurance coverage remained inadequate for the majority of Syrians [32].

Whilst this expansion in the health sector after the HSMP increased the availability of healthcare services, it also created a two-tiered system, where wealthier individuals could afford high-quality private care and lower-income populations remained dependent on an underfunded public sector [28, 32]. The HSMP aimed to introduce social health insurance as a means of reducing financial barriers to healthcare. However, the implementation was slow and ineffective, with most citizens continuing to rely on direct payments for medical services [30, 33]. One of the major concerns regarding health insurance expansion was the potential for corruption and inefficiency, as voiced by policymakers and the public. Corruption and informal payments became widespread in both public and private sectors, further straining healthcare accessibility for those unable to afford additional costs [31, 32]. Post-2011, the conflict further dismantled existing financing structures, with reduced government revenues and increased reliance on external aid and humanitarian funding [31]. Charitable nongovernmental organizations (NGOs), private health insurance, payments from private corporations and external aid were mentioned in one of the studies as negligible sources of health expenditure without detailed information [34].

Health governance

A total of 13 studies discussed aspects of health governance in Syria during the review timeline [22, 23, 27–35, 38, 40]. The health system governance in Syria was characterized by centralized planning and decision-making under the MoH, with limited community participation or accountability mechanisms [22, 33, 34]. Policies and reforms were implemented through a top-down approach, often without evidence-based planning or effective stakeholder consultation [30, 34]. Several studies noted that governance structures remained rigid, with weak integration between public and private sectors and minimal decentralization [22, 30].

The Semashko-resembled health governance in Syria was highly centralized, with the MoH in Damascus responsible for policy development, resource allocation and oversight of healthcare services [22, 30, 33]. The MoH regulated public hospitals, health centres and pharmaceutical production. However, multiple ministries have played key roles, through parallel systems, in health service provision, financing, workforce management and policy implementation. The hospital network in Syria was distributed across different authorities, with the MoH managing the largest share, primarily comprising general and specialized public hospitals that provided free or low-cost services to the general population [30, 32]. The MoHE operated university hospitals, which functioned as training centres for medical students and specialized referral hospitals. The MoD and Ministry of the Interior

(MoI) managed 18 and 2 military and police hospitals, respectively, offering advanced medical care but restricting access to security forces and their dependents. The MoSAL-supervised hospitals focussed on rehabilitation and social welfare services. The Ministry of Local Administration (MoLA) played a role in public health initiatives and infrastructure development, particularly in primary healthcare centres and sanitation programs that contribute to enhancing public health measures and services [22, 28, 30, 32, 34, 40]. The involvement of multiple ministries in the health system management and administration was characterized by poor interministerial coordination that led to overlapping responsibilities, inefficiencies in resource allocation and service delivery gaps, with certain institutions receiving preferential funding whilst others suffered from chronic underinvestment [28, 30]. Focussing on the major cities in Syria, such as Damascus, Aleppo and Latakia, and neglecting other governorates, this fragmented governance structure contributed to inconsistent healthcare quality and accessibility, particularly in rural and underserved regions [23, 32]. Figure 4 illustrates the organization of health services in Syria.

Beyond hospital governance, the MoH played a central and sole role in overseeing the primary health system, which was intended to ensure universal access to preventive and basic healthcare services [28, 30, 32, 40]. Primary healthcare centres in Syria are classified into three tiers on the basis of the population of their administrative units: province, district and subdistrict or village. The lower subdistrict tier provides basic maternal and child

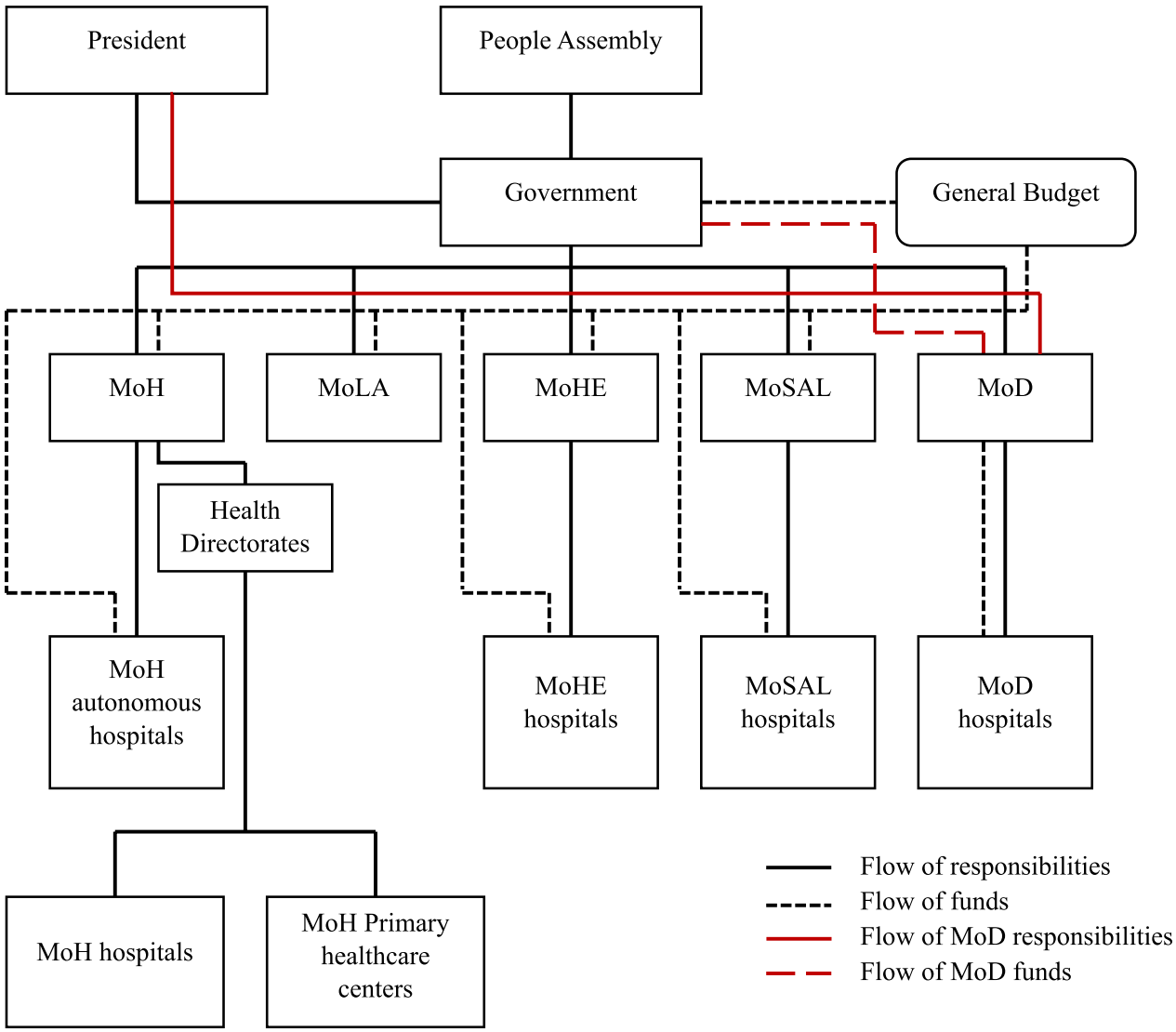

Fig. 4 Health system profile—Syria (Source: WHO regional office for the Eastern Mediterranean 2005)

health services, and the second tier includes the district-level centres that offer a broader range of curative and preventive services. The highest tier comprises hospitals, polyclinics and specialized centres, such as tuberculosis centres in major cities, which deliver specialized services, including the management of chronic diseases [22]. However, centralized governance resulted in rigid administrative structures, funding limitations and disparities in service distribution, particularly affecting the third-tier services in rural and marginalized communities [32].

The HSMP sought to improve primary healthcare governance by introducing decentralization policies and strengthening public–private partnerships, but these reforms were incomplete and failed to significantly enhance primary care accessibility before the conflict [30, 32]. Additionally, the HSMP led to greater privatization, which reduced government control over key aspects of healthcare provision [32, 34]. This shift weakened the role of the state in ensuring equitable access to healthcare, as private-sector growth was poorly regulated, leading to widening disparities in service availability and quality [31].

Although the health system in Syria remained centrally governed, there were attempts to introduce elements of decentralization, particularly in the financing and management of public hospitals [30, 32]. Some autonomous hospital management models were piloted, allowing hospitals to generate their own revenue and operate with greater financial flexibility [28, 30]. However, these efforts failed to create meaningful decentralization, as decision-making authority remained concentrated in Damascus, and local health directorates had limited control over resource allocation and service planning [32]. The lack of regional autonomy in healthcare governance contributed to geographical disparities in service provision, with urban centres benefitting from better-funded and well-staffed facilities, whilst rural areas remained underserved [27, 34]. Additionally, governance failures in rural health administration resulted in chronic shortages of specialized medical staff, inadequate infrastructure and inconsistent drug supply chains in rural regions [23, 32].

One of the most significant weaknesses in the health system governance in Syria was the ineffectiveness of regulatory and monitoring frameworks for healthcare facilities, national strategies implementation, pharmaceutical production and private-sector activities. For example, there was no national strategy for noncommunicable disease prevention and control. In addition, MoH officials in charge of drafting health policies and strategies often hold multiple roles, typically as specialized doctors who operate private clinics in the afternoon whilst managing administrative duties at the MoH in the morning. This multiplicity of roles often leads to poor follow-up mechanisms and unfinished duties, exacerbated by weak handover processes, resulting in drafts being left incomplete and shelved without finalization [28, 30, 33]. Although the MoH was responsible for licensing healthcare providers, monitoring service quality and regulating drug production, its enforcement capacity was limited to the public sector, leading to inconsistencies in healthcare standards and widespread informal practices [22, 29, 31, 40]. Furthermore, corruption in the health sector was another major governance issue, with reports indicating that healthcare access, licensing and resource allocation were often influenced by favouritism, bribery and political connections [30, 32]. The proliferation of informal payments in public hospitals, where patients were expected to pay under-the-table fees for faster access to care, further eroded public trust in the system [32]. Additionally, fraudulent practices in the pharmaceutical sector became a growing concern, as unregulated private distributors and pharmacies were found to bypass government price controls, leading to overpricing and inconsistent drug quality [29].

Discussion

This scoping review provided a comprehensive overview of the available studies on the model and structure of the health system in Syria during the period 2000–2024, relying on the health system building blocks defined by the WHO as the theoretical framework for study and analysis. During the study period, the Syrian health system was characterized by a discrepancy between the presumed Semashko model and the mechanisms of operation and management of the system. This discrepancy became particularly pronounced after the launch of the EU-supported HSMP. Several studies indicated that this program proposed plans detached from the socioeconomic reality in Syria and the numerous challenges, including corruption and poverty.

It can be said that the keyword to describe the Syrian health system is the adoption of the Semashko model, inherited from the Soviet Union, an outdated system rooted in Soviet ideology, characterized by state dominance over the health system and a centralized decision-making approach with a lack of separation between political authority and health system leadership [43]. This model became outdated and underwent significant distortion and deviation in most countries that had adopted it, especially after the collapse of the Soviet Union, where the focus shifted towards developing hospital services, particularly in major cities, while parallel health systems emerged under multiple ministries and primary healthcare packages and equitable access to health services were neglected [44–47]. Antoun et al. [48], in their article, illustrated how this model in Russia and Albania

suffered from underfunding, weak infrastructure, the dominance of political ideology over health system leadership, poor governance and lack of investment in available human and financial resources. Numerous studies have discussed how the political structures of centralized decision-making and bureaucracy in most countries that adopted the Semashko model provided a ground for the emergence of weaknesses and widespread corruption in the health systems of these countries [46, 49, 50].

Syria, during the previous political regime, exemplified one of those countries where the health system suffered from poor financing and planning, low income and investment in human resources, favouritism, poor management and the use of the system for political and ideological purposes to a significant degree, resulting in a distortion of the health system from what it was supposed to be. The changes introduced by the previous political regime in Syria after 2000 do not seem to have led to a substantial transformation of the health system, as indicated by the studies included in this review, especially in the absence of a health information system and reliable health data that could be used to infer such changes [27, 30, 33]. Despite the launch of the HSMP in Syria in 2003, it did not achieve the desired development of the health system. Rather, some studies suggested that the program had catastrophic effects on a wide segment of the population [30–32]. Unfortunately, there is a lack of publications on this program in Syria that allow a comprehensive understanding of its goals and activities. It can be assumed that the program aimed to support the health system by developing governance mechanisms, financing models and quality control in the hospital sector. Nevertheless, the program was confined to the health system without considering the economic conditions and low income, nor did it take into account the health system model or the feasibility of adapting the modernization program to its structure. Although this assumption is not fully documented, studies clearly supported it by discussing the negative impact of privatization on access to healthcare services for low-income groups in Syria. The included records also indicated that privatization did not result in systematic changes to the governance structure of the health sector, allowing the private sector to operate without accountability or oversight [31, 32, 34].

Syria is currently experiencing a profound political change following the fall of the previous political regime after 14 years of internal conflict that destroyed infrastructure, collapsed the economy and led to widespread poverty and corruption [8]. Thus, any attempt to develop the health system requires a different approach from that adopted by the HSMP. The current situation represents a golden opportunity to consider early recovery strategies suitable for the post-crisis context. Undoubtedly, this topic represents a broad field for new research to introduce scientific and systematic solutions for reviving the health sector in Syria. This study serves as a reference for those who will engage in this field to understand the health system model and build upon its strengths and weaknesses. For example, it is evident from the studies that there has been a chronic weakness in the primary healthcare and health promotion and prevention programs in Syria over the past decades, with disproportionate attention given to hospitals and secondary healthcare services. Several studies highlighted patients' perspectives, particularly those from rural and marginalized areas, on improving access to primary healthcare services and reducing out-of-pocket expenditures that limited their ability to seek care [25–27, 35, 38, 40, 42]. This study also demonstrated that the human resources sector suffered greatly from neglect regarding income and the provision of continuous learning programs, leading many medical professionals to leave the country, particularly after the war, seeking better living opportunities. The selected records showed that healthcare providers consistently emphasized the urgent need for investment in workforce development, improved salaries and safer working environments to prevent further migration of qualified personnel [25, 37–40, 42]. Furthermore, the lack of effective oversight and accountability mechanisms encouraged corruption and the emergence of unregulated practices, particularly in the private healthcare and pharmaceutical sectors. Multiple studies revealed frustration amongst stakeholders because of weak governance structures, unregulated pharmaceutical markets and lack of community engagement in health planning [35, 37, 38, 40, 42]. These insights suggest that early recovery strategies must be participatory, addressing both system-wide reforms and the frontline experiences of those who deliver and use healthcare services.

Finally, it is worth mentioning that the scarcity of academic references on the study topic constituted one of the main limitations. The inclusion of grey literature, literature review studies and government documents, whilst necessary due to the scarcity of peer-reviewed studies on the Syrian health system, introduces variability in source quality and reporting standards. Additionally, the focus on literature pertaining to government-controlled areas excludes information from areas that were out of government control, which were out of the scope of this research. Another important limitation related to the conceptual framework adopted in this study is the use of WHO's six building blocks of health systems. Whilst providing a widely accepted structure for organizing health system components, this framework is not exhaustive. Specifically, it does not explicitly account for infrastructure, digital health

technologies or the broader sociopolitical and conflict-specific determinants of health system performance. These elements are particularly relevant in the Syrian context, where infrastructure destruction and geopolitical fragmentation have profoundly shaped health system functioning.

Conclusions

This review highlights that the Syrian health system between 2000 and 2024 evolved into a fragmented and inefficient structure, combining outdated elements of the Semashko model with inconsistent neoliberal reforms. As Syria enters a critical recovery phase following major political changes, rebuilding the health system must be grounded in its unique historical, political and socioeconomic context. The recovery of the health system in post-conflict Syria must avoid replicating past mistakes. Future health system recovery must prioritize rebuilding an equitable primary healthcare network. Historically marginalized, primary care services must be re-established as the cornerstone of the health system, ensuring free or low-cost access, particularly in rural and underserved areas. Public investment should focus on restoring and expanding first-line services (such as maternal and child health programs, vaccination and chronic disease prevention) rather than only hospitals concentrated in cities.

Syria faces a depleted and demotivated workforce after years of conflict and underinvestment. Recovery plans must include strategies for recruiting, training and retaining health workers, particularly through financial incentives for rural deployment, professional development opportunities and rebuilding medical education to align with national health needs. Additionally, a national health information system must be established to replace the outdated and fragmented systems of the past. A reliable health information system is crucial for evidence-based policymaking, equitable resource distribution and monitoring health outcomes across all regions.

Health financing reforms should address the over-reliance on out-of-pocket payments, which historically burdened poor population. The establishment of a universal health coverage scheme that protects citizens against catastrophic health expenses is essential, especially after the socioeconomic collapse due to the conflict. Financing mechanisms should be progressive and equity-oriented, prioritizing vulnerable populations. In addition, fragmentation caused by parallel systems under different ministries must be reconsidered through integrated health governance, with clear lines of accountability, transparent regulation of the private sector and community participation in health decision-making.

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Availability of data and materials
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Declarations

Ethics approval and consent to participate
Not applicable.

Competing interests
The authors declare no competing interests.

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