

# Strengthening Health Systems in Conflict: Evidence-Based Policies for Quality Care in Yemen

Ammar Ali Alraimi\* and Abhijeet Shelke

Management Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra, India

**\*Corresponding author**

Ammar Ali Alraimi, Management Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra, India.

Received: February 24, 2024; Accepted: March 02, 2024; Published: March 11, 2024

## ABSTRACT

Yemen's health system has faced formidable obstacles due to the enduring conflict since 2014, resulting in compromised infrastructure, disrupted services, and exacerbated vulnerabilities. This discourse meticulously analyzes the primary health system challenges in Yemen within the framework of the World Health Organization's six pillars. It subsequently presents evidence-based policy recommendations to enhance Yemen's health system and ensure the provision of high-quality and equitable care. In terms of service delivery, it suggests augmenting the presence of community health workers, leveraging mobile health technology, rehabilitating facilities, and improving emergency obstetric care. Regarding the health workforce, it proposes financing mechanisms for adequate remuneration, task-shifting strategies, embracing telemedicine, and fostering partnerships with universities. To strengthen information systems, it advocates for the enhancement of facility reporting, the implementation of national surveys, the utilization of mobile phone surveys, and the adoption of robust health information software. Regarding essential medicines, it recommends reorganizing regulations pertaining to selection, procurement, storage, and distribution. For health financing, it highlights the importance of increasing domestic budget allocation, implementing user fee exemptions, adopting performance-based financing mechanisms, and strengthening financial management systems. Last, in terms of governance, it emphasizes the need for transparent and accountable leadership, effective coordination mechanisms, and inclusive policy-making processes. Yemen requires sustained political commitment and adequate resources to facilitate the comprehensive reconstruction of its health system.

**Keywords:** Health Systems, Conflict, Quality Care, Yemen

## Introduction

Yemen's health system grapples with formidable challenges. The enduring conflict since 2014 has inflicted extensive damage on health infrastructure and disrupted vital health services, leaving a mere 51% of health facilities fully operational [1]. This has further exacerbated the fragility of the already strained health system, characterized by inadequate access to healthcare, subpar health outcomes, and glaring health inequities [2]. Notably, Yemen has the highest maternal mortality rate in the Arabian Peninsula, with 365 deaths per 100,000 live births [3]. Consequently, the development of robust, equitable, and high-quality health systems in Yemen assumes paramount importance. The World Health Organization (WHO) underscores six fundamental pillars for a resilient health system: service delivery, health workforce, health information systems, access to essential medicines, financing, and governance [4]. Recent research confirms that progress across all these pillars is indispensable for enhancing health system performance and population health [5]. For instance, enhancing service delivery by bolstering the availability of skilled birth attendants and emergency obstetric care yields significant reductions in maternal mortality [6]. To cultivate quality health systems in Yemen, both during and after

the conflict, policymakers and stakeholders must prioritize a combination of short-term humanitarian responses and long-term health system strengthening across the six pillars. This necessitates comprehensive health system assessments, effective policy formulation and planning, and sustained investments with a focused emphasis on equity and community engagement. [7,8]. Practical approaches encompass expanding community health worker programs, implementing performance-based financing, harnessing the potential of mobile health technologies, and engaging local stakeholders in health system decision-making [9-11]. This article meticulously examines Yemen's profound health system challenges and presents evidence-based policies for cultivating equitable and high-quality health systems in fragile and conflict-affected contexts. It puts forth pragmatic recommendations for fortifying health service delivery, the health workforce, information systems, essential medicines, financing, and governance in Yemen.

## Health System Challenges in Yemen

Yemen's healthcare system faces formidable challenges across all six pillars of the World Health Organization's healthcare system. These pillars serve as crucial foundations for a strong and resilient healthcare system.



**Figure 1:** The six pillars of the World Health Organization's healthcare system

### Service Delivery

It is worth highlighting that a mere 50% of health facilities remain operational, as airstrikes have caused damage or destruction to over 500 facilities [12]. Moreover, there is a shortage or complete absence of vital medical equipment [13]. The conflict has also resulted in disruptions to vaccination programs, leading to a surge in measles cases [14]. Access to primary care and hospitals offering essential services such as emergency obstetric care is severely limited, leaving many Yemenis without the necessary care [15].

### Health Workforce

It is crucial to emphasize that the healthcare workforce has been reduced by 50% since 2015, with over 50% of physicians and nurses abandoning their posts due to the nonpayment of salaries [16]. Additionally, primary healthcare centers in remote areas frequently lack permanent medical staff, posing challenges to delivering consistent care to surrounding communities [17]. The absence of health workers significantly hampers service delivery.

### Health Information Systems

Yemen lacks robust health information systems and comprehensive data [18]. The insufficient availability of essential population health data hinders health planning and monitoring efforts [19,20].

### Essential Medicines

It is important to note that essential medicines are not readily accessible in Yemen, particularly medications for chronic illnesses [21]. Shortages encompass critical medicines. Private pharmacies provide limited access for those who can afford it [21]. Medicine supply chains

**Service Delivery Health Workforce Essential Medicines Governance Health Financing Health Information Systems** are hampered by funding shortfalls, port restrictions, and infrastructure damage.

### Health Financing

Health spending as a percentage of GDP has significantly increased from 0.8% between 2004 and 2015 to an average of

2.9–4.1% [22]. Additionally, government investment in health has experienced a marked rise from 0.8% of GDP to an average of 7.1–12.2% [22]. However, out-of-pocket payments constitute over three-quarters of total health expenditures [15]. The conflict has further exacerbated funding shortfalls, with external aid accounting for one-third of the funds [23]. Nevertheless, reliance on aid poses a threat to sustainability.

### Governance

It is significant to acknowledge that fragmented governance across Houthi-controlled northern Yemen and the internationally recognized government in the south complicates coordination and coherence in policies [24]. Bureaucracy and top-down management hinder agile decision-making [25].

Recommendations for Enhancing the Health System's Capacity Given the multitude of challenges faced by Yemen's health system, it is imperative to fortify it through evidence-based measures across all pillars of the esteemed World Health Organization.

### Service Delivery

To enhance access to primary care, it is recommended to expand community health worker programs [26]. Leveraging mobile technology can effectively connect these workers with the broader health system [27]. Priority should be given to the reconstruction of damaged health facilities, ensuring adequate staffing, equipment, and supplies [28]. Furthermore, improving accessibility to emergency obstetric care can be achieved through the utilization of mobile clinics, community midwives, and maternity waiting homes [29].

### Health Workforce

Facilitating the financing of health worker salaries can be accomplished through voucher programs, payment guarantees, or donor-funded allowances [30]. In low-income countries, alternative payment schemes can significantly impact the performance of health workers, considering that salaries serve as their primary means of remuneration [31]. Task shifting is a viable strategy to expand the roles of community health workers and nurses [32]. Additionally, initiating telemedicine networks can provide remote specialist consultations to underserved areas [33]. Establishing partnerships with universities can help incentivize medical studies and retention [34].

### Health Information Systems

Strengthening facility reporting can be achieved through simplified forms, phone reporting, and data use feedback [35]. It is strongly recommended to establish a comprehensive national population health survey system [36]. Leveraging mobile phones for community surveys can enhance data collection efforts [37]. Investment in district health information software and training workers in data use are crucial steps toward improving health information systems [38].

### Essential Medicines

Policy reform is warranted to simplify the selection, procurement, storage, and distribution of essential medicines [39]. Exploring contracting with international agencies for procurement support can prove beneficial [40]. Subsidizing local private-sector drug supplies and supplementing them with quality imports is advisable [41].

## Health Financing

Advocacy for increased domestic budget allocation to health is necessary to ensure sustainable financing [42]. Expanding user fee exemptions and implementing health equity funds for the poor are commendable actions [43]. Exploring performance-based financing linked to service quality and access can also be beneficial [44]. Transitioning from short-term humanitarian aid to aligned development assistance is essential for the long-term stability of health financing [45].

## Governance

Establishing a robust coordination mechanism between northern and southern health authorities is critical for effective governance [46]. Urgent attention should be given to developing an efficient coordination mechanism between various tiers of the health structure [46]. Engaging professional associations and communities in policymaking is advisable to foster inclusivity and effectiveness [47]. Furthermore, strengthening management capacity at decentralized levels is vital for efficient and responsive governance [48].

By implementing these evidence-based recommendations, Yemen's health system can strive toward resilience, equity, and excellence, even amidst the formidable challenges it faces.

## Conclusion

The Yemeni health system necessitates significant enhancement in all aspects to furnish quality and impartial healthcare. Given the prolonged conflict, it is crucial to implement practical policies for strengthening the health system that can enhance service delivery, workforce availability, information systems, access to indispensable medications, health financing, and governance. While long-range reconstruction will demand consistent resources and political dedication, targeted interventions can achieve gradual enhancements in the populace's health and well-being. Robust local, national, and international partnerships that concentrate on bolstering the health system will be pivotal to fulfilling the aspiration of delivering quality healthcare to all in Yemen.

## Declarations

**Funding:** None.

**Conflict of Interest:** The authors declare no conflicts of interest.

**Author Contributions:** The authors contributed equally to this work

**Ethics Approval and Consent to Participate:** Not applicable

**Availability of Data:** Not applicable

## References

- Nathan P, Miller N, Nureyan Z, Taha A, Abdulrahman AS, et al. Implementing integrated community case management during the conflict in Yemen. *Journal of Global Health*. 2020. 10: 020601.
- Naseeb Q, Sharif I. Health system functionality in a low-income country during conflict: the case of Yemeni health policy and planning. 2017. 32: 911-922.
- Tahreem AK, Abdulaziz ME, Abdulrahman AK, Abdulhadi A, AlAmodi AA. Women's health and empowerment in Yemen. *The Lancet*. 2014. 383: 2121.
- Sanjay Z, Anjali S. Leadership Development for Health Systems Strengthening: A Focus on Human Resources for Health. *Annals of Community Health*. 2016. 4: 3-6.
- Margaret E, Kruk AD, Gage C, Arsenault C, Jordan K, et al. High-quality health systems in the Sustainable Development Goals era: time for a revolution *The Lancet Global Health*. 6
- Ludo N, Yohana M. Health care workers' experience in emergency obstetric care following the implementation of an in-service training program: the case of two referral hospitals in Botswana *African Health Sciences*. 2021. 21: 51-58.
- Joseph JV, Sima B, Jackline O, William V, Baburam D, et al. Is development aid to strengthen health systems during protracted conflict a useful investment? The case of South Sudan. 2011-2015, *BMJ Global Health*. 2020. 5,
- Devin GA, Atallah DG, Djalali A, Fredricks K, Arlington L, et al. Developing Equitable Primary Health Care in Conflict-Affected Settings: Expert Perspectives from the Frontlines *Qualitative Health Research*. 2018. 28: 98-111.
- Jeffrey G, Corrina M, Denise DP, Allison C, James S, et al. What is the impact of removing performance-based financial incentives on community health workers' motivation? A qualitative study from an infant and young child feeding program in Bangladesh, *BMC Health Services Research* 2021. 21: 979.
- Denizhan D, Sebastian B, Peter B, Tania G, Clovis K, et al. The role of health system context in the design and implementation of community health worker programs: a scoping review. *Health Policy and Planning*. 2020. 35: 86-99.
- Emily B Wroe, Basimenye Nhlema., Elizabeth L Dunbar, Alexandra V Kulinkina, Chiyembekezo Kachimanga, et al. A household-based community health worker program for noncommunicable disease, malnutrition, tuberculosis, HIV, and maternal health: a stepped-wedge cluster randomized controlled trial in Neno District, Malawi *BMJ Global Health*. 2021. 6.
- Fekri Dureab, Taha Hussain, Rashad Sheikh, Najwa Al-Dheeb, Sameh Al-Awlaqi, et al. Forms of Health System Fragmentation During Conflict: The Case of Yemen. *Frontiers in Public Health*. 2021. 9: 659980
- Mohamed Izham, Mohamed Ibrahim, Mohammed Alshakka, Nazeem Al-Abd, Awsan Bahattab, et al. Availability of Essential Medicines in a Country in Conflict: A Quantitative Insight from Yemen. *International Journal of Environmental Research and Public Health*. 2020. 18: 175
- Abdulkareem Ali Hussein Nassar, Mohammed Abdullah Al Amad, Mohammed Qasim, Fekri Dureab. Risk factors for measles outbreaks in Ataq and Habban districts, Shabwah governorate, Yemen. *BMC Infectious Diseases*. 2021. 21:551-551
- Jens Holst, Christian A, Gericke. Healthcare financing in Yemen. *International Journal of Health Planning and Management*. 2012, 27:198-225.
- Jeannie Sowers, Erika Weinthal, Humanitarian challenges and the targeting of civilian infrastructure in the Yemen war. *International Affairs*. 2021. 97: 157-177.
- Prastuti S, Meliyanni J, Retno P, Halimah H, Dwi Oktiana Irawati. Inspecting primary healthcare centers in remote areas for facilities, activities, and finances. *Journal Administrate Kesehatan Indonesia*. 2019. 7: 89-98.
- Boerma T. Public health information needs in districts. *BMC Health Services Research*. 2013. 13: 12-12.

19. Kent G, Charles J, Fox E, Abdalla M, Tatem AJ, et al. Estimating access to health care in Yemen, a complex humanitarian emergency setting: a descriptive applied geospatial analysis. *The Lancet GlobalHealth*. 2020. 8.
20. Suprenant M, Gopaluni A, Dyson M, Al-Dheeb N, Shafique F, et al. A predictive model for healthcare coverage in Yemen's conflict and health. 2020. 14: 55.
21. Mohamed Izham Mohamed Ibrahim, Mohammed Alshakka, Naze Al-abd, Awsan Bahattab, Wafa Badulla. Availability of Essential Medicines in a Country in Conflict: A Quantitative Insight from Yemen. *Int J Environ Res Public Health*. 2021. 18: 175.
22. Al-Batuly A, Al-Hawri M, Cicowicz M, Lofgren H, Pournik M. Realizing the Millennium Development Goals through socially inclusive macroeconomic policies: a country study: Assessing Development Strategies to Achieve the MDGs in the Republic of Yemen. United Nations Department for Social and Economic Affairs. 2011.
23. Lis P, The Impact of Armed Conflict and Terrorism on Foreign Aid: A Sector-Level Analysis. *World Dev*. 2018.110: 283-294.
24. Marina E. Nonstate armed actors and contested sovereignties in internationalized civil wars: the case of Yemen's civil war (2015) *Int Polit*. 2021. 1-20.
25. Carlos Rey, Nuno Pitta, Donatas Ramonas, Phil Sotok, Agile Purpose: Overcoming Bureaucracy. 2019.75-86.
26. Andrea L Hartzle, Leah Tuzzio, Clarissa Hsu, Edward H Wagner. Roles and Functions of Community Health Workers in Primary Care. *Annals of Family Medicine*. 2018. 16: 240-245.
27. Sriram Iyengar. Mobile health. 2020. 277-294.
28. Debar Banerji. Reconstructing the critically damaged health service system of the country. *International Journal of Health Services*. 2012. 42: 439-464.
29. Alaofè H, Lott B, Kimaru L, Okusanya B, Okechukwu A, et al. Emergency Transportation Interventions for Reducing Adverse Pregnancy Outcomes in Low-and Middle-Income Countries: A Systematic Review. *Ann Glob Health*. 2020. 86.
30. Bowser D, Gupta J, Nandakumar A. The Effect of Demand- and Supply-Side Health Financing on Infant, Child and Maternal Mortality in Low-and Middle-Income Countries: *Health Systems and Reform*. 2016. 2: 147-159.
31. Marko Vujicic. How you pay health workers matters: a primer on health worker remuneration methods. 2009. 1-7.
32. Claire Glenton, Dena Javadi, Henry B Perry. Community health workers at the dawn of a new era: roles and tasks *Health Research Policy and Systems*. 2021. 19: 128.
33. Cátia Gonçalves, Anicolette da Mata, Lus Velez Lapo. Leveraging technology to reach global health: The case of telemedicine in the So Tomé and Príncipe health system. *Health Policy and Technology*. 2021. 10: 100548.
34. B Nash, JJ Veloski. Emerging Opportunities for Educational Partnerships Between Managed Care Organizations and Academic Health Centers. *Western Journal of Medicine*. 1998. 168: 319-3297.
35. Maga A, Jiwani S, Mutua MK, Porth T, Taylor C, et al. Generating statistics from health facility data: the state of routine health information systems in Eastern and Southern Africa. *BMJ Global Health*. 2019. 4: 001849.
36. Maina I, Wanjala P, Soti D, Kipruto H, Droti B, et al. Using health-facility data to assess subnational coverage of maternal and child health indicators in Kenya *Bull World Health Organ*. 2017. 95: 683-694.
37. Mahajan A, Czerniak C, Lamichhane J, Phuong L, Purnat T, et al. WHO's public health research agenda for managing endemics *Eur J Public Health*. 2021. 3: 164.030.
38. Huang M, Wang J, Nicholas S, Maitland E, Guo Z. Development, Status Quo, and Challenges to China's Health Informatization During COVID-19: Evaluation and Recommendations, *J Med Internet Res*. 2021. 23.
39. Moore W, Dickens M, Bland V, Bertram C, Zembower T, et al. Standardizing a centralized allocation process for rarely used anti-infective medications across a health system: the Open Forumon Infectious Diseases. 2022.
40. Roel Beetsma, Brian Burgoon, Francesco Nicoli, Francesco Nicoli, Anniek de Ruijter, et al. Public support for European cooperation in the procurement, stockpiling, and distribution of medicines. *European Journal of Public Health*. 2021. 31: 253-258.
41. Haakenstad A, Kalita A, Bose B, Cooper J, Yip W. Catastrophic health expenditure on private sector pharmaceuticals: a cross-sectional analysis from the state of Odisha, India. *Health Policy and Planning*. 2022. 37: 872-884.
42. Perry H, Chowdhury M, Were M, Leban K, Crigler L, et al. Community health workers are at the dawn of a new era. CHWs are leading the way to "Health for All". *Health Res Policy Syst*. 2021. 19.
43. Dastan I, Abbasi A, Arfa C, Hashimi M, Alawi S. Measurement and determinants of financial protection in health in Afghanistan. *BMC Health Services Research*. 2021. 21.
44. Witter S, Bertone M, Diaconu K, Bornemisza O. Performance-based Financing versus "Unconditional" Direct Facility Financing: A False Dichotomy? *Health Systems & Reform*. 2021. 7.
45. Harpring R, Maghsoudi A, Fikar C, Piotrowicz W, Heaslip G. An analysis of compounding factors in epidemics in complex emergencies: a system dynamics approach *Journal of Humanitarian Logistics and Supply Chain Management*. 2021.
46. Shrestha N, Mishra S, Ghimire S, Gyawali B, Marahatta S, et al. Health System Preparedness for COVID-19 and Its Impacts on Frontline Health-Care Workers in Nepal: A Qualitative Study Among Frontline Health-Care Workers and Policy-Makers *Disaster Medicine and Public Health Preparedness*. 2021. 1-9.
47. Bolleyer N. Civil society: politically engaged or member-serving? A governance perspective on European Union politics. 2021. 22: 495-520.
48. Sabir B, Othman B, Gardi B, Ismael N, Hamza P, et al. Administrative Decentralization: The Transfer of Competency from the Ministry of Education to General Directorates. *International Journal of Rural Development, Environment, and Health Research*. 2021. 5: 1-13.