

## Resource Allocation Within Healthcare in a Lower Middle-Income Country: What Do Doctors Think?

**Authors:** Ruqayya Manzoor, Hijab Shaheen, Nuzhat Yasmeen, Junaid Jamshed, Muhammad Wasim Khan, Nazia Rafique

**Corresponding Author:** Ruqayya Manzoor

**Affiliation:** Department of Pediatric Oncology, Children Hospital, PIMS, Islamabad, Pakistan

**Published:** December 22, 2025



DOI: [10.69690/ODMJ-001-1222-6139](https://doi.org/10.69690/ODMJ-001-1222-6139)



# Resource Allocation Within Healthcare in a Lower Middle-Income Country: What Do Doctors Think?

**Authors:** Ruqayya Manzoor, Hijab Shaheen, Nuzhat Yasmeen, Junaid Jamshed, Muhammad Wasim Khan, Nazia Rafique

**Corresponding Author:** Ruqayya Manzoor

**Affiliation:** Department of Pediatric Oncology, Children Hospital, PIMS, Islamabad, Pakistan

**Published:** December 22, 2025

## ABSTRACT

**Background:** Equitable healthcare resource allocation is a pressing challenge in low- and middle-income countries (LMICs), where underfunding, weak infrastructure, and workforce shortages obstruct progress toward Universal Health Coverage (UHC). Pakistan allocates only 1.5% of its Gross Domestic Product to health, significantly below the World Health Organization's (WHO) recommended 5% benchmark, leading to persistent inequities and suboptimal outcomes. Empirical evidence on how frontline physicians perceive and navigate these constraints is scarce. This study explored physician perspectives on healthcare resource allocation in Pakistan.

**Methodology:** A descriptive, cross-sectional survey was conducted between January and June 2024 among 404 licensed physicians recruited through convenience and snowball sampling. Data were collected using a structured online questionnaire comprising items on socio-demographic characteristics, perceptions of resource allocation, and recommendations for improvement. Quantitative data were analyzed using SPSS to generate descriptive statistics, while qualitative responses, obtained through open-ended questions, were analyzed thematically.

**Results:** Of 404 respondents, 58.7% were male and 50.5% aged 30–50 years; pediatrics (38.1%) and general medicine (22.3%) were the most represented specialties. Overall, 71.1% reported that resource scarcity compromised patient care, and 89.1% noted delays in the delivery of chronic care. Physicians favored allocating resources to diagnostics (61.9%) and diseases with better prognoses (79.5%). Nearly all endorsed expanding the healthcare workforce (97.0%), strengthening infrastructure (95.3%), and adopting equitable allocation policies (95.1%). Qualitative responses emphasized prevention, policy reform, and public–private partnerships as critical solutions.

**Conclusion:** Physicians identified resource allocation as central to healthcare delivery in Pakistan, with clear priorities for diagnostics, equity, and workforce expansion. Their perspectives highlight urgent system-level reforms: scaling investments in infrastructure and human resources, embedding equity and prevention into allocation frameworks, and leveraging partnerships to optimize efficiency. These findings provide context-specific, practitioner-informed evidence to guide policy reforms in LMICs striving toward UHC.

**Key words:** Resource allocation, health systems, physicians' perspectives, Pakistan, Universal Health Coverage

# INTRODUCTION

Resource allocation within healthcare systems is one of the most complex and pressing challenges in health management<sup>1</sup>. Unlike other sectors, healthcare resources are finite yet universally needed, making allocation decisions inherently difficult and politically sensitive<sup>2</sup>. Healthcare resources are broadly categorized into three domains, including infrastructure, human resources, and essential supplies<sup>3</sup>. Population health outcomes depend on the interaction of these domains, functioning in synergy to deliver effective and equitable healthcare<sup>4</sup>.

Global health standards define low-resource settings (LRS) as systems that fail to meet accepted benchmarks for these domains<sup>5</sup>. The World Health Organization emphasizes Universal Health Coverage (UHC) within the Sustainable Development Goals (SDG-3), aiming to ensure equitable access to quality healthcare by 2030. Achieving this requires not only financial investment but also a motivated, competent workforce supported by adequate infrastructure and supplies<sup>6</sup>.

In high-income countries (HICs), where health expenditure averages 9-12% of Gross Domestic Product (GDP), resource allocation frameworks are designed to balance efficiency with equity<sup>7</sup>. In contrast, low- and middle-income countries (LMICs) face severe imbalances in infrastructure, supplies, and human resources due to economic constraints, weak governance, and external shocks such as conflict or natural disasters<sup>8,9,10</sup>. These imbalances undermine equitable access and obstruct progress toward UHC.

Pakistan exemplifies these challenges. With a population exceeding 230 million, health spending remains at just 1.5% of GDP, well below WHO's recommended 5% and far less than regional countries such as India (3%) and global averages (9-12%)<sup>11</sup>. This chronic underinvestment manifests as shortages of infrastructure, essential medicines, and skilled professionals, alongside stark urban-rural disparities. These structural deficits translate into poor outcomes, including under-five mortality that remains at 65 per 1,000 live births (compared with fewer than 10 in most HICs), maternal mortality is 140 per 100,000 live births (vs. < 20 in HICs), and life expectancy lags at 67 years compared with 80+ years in developed nations<sup>12,13</sup>. Rural populations, which constitute nearly two-thirds of the country, face particularly limited access to facilities and specialists, perpetuating inequities and obstructing progress toward the SDGs.

Despite these realities, empirical evidence on how frontline physicians perceive and navigate resource scarcity in Pakistan is scarce. Most prior research has focused on descriptive or policy aspects, with limited attention to practitioners' practices. Understanding physi-

cians' views is critical, as they directly experience the effects of allocation decisions on patient care and can highlight practical gaps often overlooked in top-down policymaking. Therefore, this study explores the perspectives of physicians regarding healthcare resource allocation in Pakistan. By capturing their experiences and priorities, it aims to provide context-specific evidence that can inform reforms, bridge the gap between policy and practice, and contribute to global discussions on equitable allocation in LMICs.

## Methodology

We employed a descriptive, cross-sectional study design to examine physicians' perspectives on healthcare resource allocation in Pakistan between January and June 2024. The study population included licensed physicians working in the healthcare system, encompassing general practitioners, specialists, and consultants at both early and advanced career stages. According to the Pakistan Medical and Dental Council (PMDC), 299,113 physicians were registered in 2023<sup>13</sup>.

The required sample size was calculated using Cochran's formula ( $n_0 = Z^2 \cdot p \cdot (1-p) / E^2$ ), assuming a 95% confidence level ( $Z = 1.96$ ), a 5% margin of error ( $E = 0.05$ ), and maximum variability ( $p = 0.5$ ). This yielded a sample size of 363 participants. To account for non-responses, we added 10%, resulting in a final target of 404 participants.

A non-probability convenience and snowball sampling strategy was employed. Physicians were invited through professional networks, medical societies, and social media platforms (including WhatsApp). The questionnaire was developed after reviewing relevant literature and revised following feedback from a panel of public health experts. Several modifications were made to strengthen content validity and reduce bias. The final instrument contained 17 items across three sections. Section I assessed socio-demographic characteristics of the participants, such as age, gender, specialty, and years in practice. Section II explored physicians' perspectives on resource allocation, including its perceived impact on patient outcomes, allocation preferences (e.g., tertiary vs. peripheral hospitals, diagnostics vs. treatments), prioritization of specific populations (children, patients with better prognoses, persons with disabilities), and the role of prevention. Responses were recorded on a five-point Likert scale ("Strongly Agree" to "Strongly Disagree"). Section III captured suggestions through structured items and open-ended questions, enabling thematic analysis of qualitative data.

Data collection was conducted through Google Forms. A secure link was emailed to respondents and circulated via WhatsApp to maximize reach. To prevent duplication, the form was restricted to one response per participant.

Although Google Forms and WhatsApp are widely used in LMICs for health research, their use raises data security and respondent authentication concerns. These were mitigated by password-protected survey links and single-response restrictions, but full identity verification was not possible and is acknowledged as a limitation. Follow-up reminders were sent to improve response rates. The tool was pretested among 15 physicians to assess clarity and reliability. Based on feedback, minor adjustments were made to wording and item order. Internal consistency of Likert-scale items was acceptable (Cronbach's  $\alpha = 0.87$ ).

Data analysis was conducted using SPSS version 21. Descriptive statistics summarized demographic and questionnaire variables. Continuous variables were presented as means with standard deviations (SD), while categorical variables were presented as frequencies and percentages. Open-ended responses were analyzed thematically, and representative quotations were used to illustrate key themes. Ethical approval was obtained from the Institutional Ethical Review Board (ERB) of the Pakistan Institute of Medical Sciences (PIMS), Islamabad (Ref: 1/2015/ERB/SZABMU/1227). Written informed consent was obtained electronically before participation, and confidentiality was assured.

## Results

### Demographics

The questionnaire was completed by 404 physicians, with 237 (58.7%) males and 204 (50.5%) aged 30-50 years. The largest proportion specialized in Pediatrics (154, 38.1%), followed by General Medicine (90, 22.3%), with most of them (219, 54.2%) reporting 11-15 years of practice experience (**Table 1**).

### Perceptions of Physicians on Resource Allocation

Physicians' perspectives revealed widespread concern over limited resources. Overall, 71.1% agreed that patients suffered due to resource scarcity (39.9% agreed, 31.2% strongly agreed). Similarly, 89.1% believed resource constraints delayed or denied chronic care, while nearly 80% acknowledged negative impacts on patient care within their facilities. On prioritization, 61.9% favored greater allocation to diagnostics over advanced treatment, and 79.5% supported prioritizing diseases with better prognoses. Views were divided on whether larger hospitals should receive more resources (49.5% in favor vs.

**Table 1. Demographic Characteristics of the Participants (N=404)**

Demographics	Categories	Frequency (n)	Percentage (%)
Age	< 30 years	179	44.3
	30-50 years	204	50.5
	> 50 years	21	5.2
Gender	Male	237	58.7
	Female	167	41.3
Specialty	General medicine	90	22.3
	Pediatrics	154	38.1
	Surgery	32	7.9
	Obstetrics and gynecology	37	9.2
	Pathology	17	4.2
	Other	74	18.3
Experience of practice	< 5 years	20	4.9
	5-10 years	97	24.1
	11-15 years	219	54.2
	> 15 years	68	16.8



**Table 2. Physician Perspectives on Healthcare Resource Allocation in Pakistan**

Statement	SD		D	_1		N	_2		A	_3		SA	_4	
	N	%		N	%		N	%		N	%		N	%
Patients have suffered due to limited resources during your time as a healthcare professional	5	1.2	9	2.2	103	25.5	161	39.9	126	31.2				
Limited resources result in denied or delayed healthcare services for chronic care patients	5	1.2	7	1.7	32	7.9	219	54.2	141	34.9				
Resource limitations have impacted patient care at your healthcare facility.	0	0	44	10.9	45	11.1	141	34.9	174	43.1				
Larger hospitals should receive more resources than smaller peripheral hospitals	25	6.2	115	28.5	64	15.8	103	25.5	97	24				
More resources should be allocated to diagnostics than advanced treatment modalities	0	0	76	18.8	78	19.3	109	27	141	34.9				
Priority should be given to children over senior citizens	12	3	64	15.8	148	36.6	109	27	71	17.6				
Priority should be given to diseases with better prognosis	0	0	25	6.2	58	14.4	180	44.6	141	34.9				
More resources should be allocated towards research than treatment	7	1.7	38	9.4	84	20.8	173	42.8	102	25.2				
Priority should be given to people with disabilities/ congenital malformations	0	0	85	21	138	34.2	141	34.9	40	9.9				
Should more healthcare workers/manpower be allocated?	0	0	0	0	12	3	135	33.4	257	63.6				
Should resources be directed towards improving infrastructure and equipment?	0	0	0	0	19	4.7	167	41.3	218	54				
How likely are you to support equitable resource allocation policies?	0	0	0	0	20	4.9	147	36.4	237	58.7				

\*SD=Strongly disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly agree

34.7% opposed). Regarding patient groups, 44.6% supported prioritizing children over seniors, and 44.8% prioritized individuals with disabilities or congenital malformations (**Table 2**). System-level solutions received overwhelming support, including 97.0% endorsing expanding the healthcare workforce, 95.3% favoring infrastructure and equipment upgrades, and 95.1% supporting equitable allocation policies.

## Solutions and Recommendations

Physicians proposed a multifaceted approach for improving healthcare resource allocation in Pakistan. Recommendations included routine resource assessments, establishment of allocation committees, and prioritization of emergency services, optimization of workforce utilization, strengthening public-private partnerships, and increased investment in research and preventive care. At the policy level, physicians strongly emphasized increasing the health budget and aligning allocations with disease burden. Examples of physicians' comments included: "Pakistan's healthcare needs a multifaceted solution such as resource assessments, allocation committees, and prioritized emergency services", "Investing in research, preventive care, and partnerships is key to transforming Pakistan's healthcare".

## Discussion

The allocation of scarce healthcare resources poses a significant challenge in LMICs, particularly in Pakistan, where the healthcare system faces chronic underfunding and resource scarcity. These challenges are compounded by rapid population growth, economic fragility, political instability, and persistent rural-urban inequities<sup>11</sup>. Our study contributes original and context-specific evidence from physicians working at the frontline, thereby extending beyond descriptive reporting and adding to the global discourse on equity and efficiency in health systems.

The majority of physicians reported that patients suffered due to limited resources, with chronic care often delayed or denied. These findings resonate with surveys from Europe (Switzerland, Norway, Italy, UK), where constrained resources similarly contributed to delayed care<sup>14</sup>. In Pakistan, this is particularly concerning given that national healthcare expenditure is far below the WHO-recommended estimates and substantially lower than HICs<sup>15</sup>. This funding gap directly translates into poor outcomes, such as Pakistan's under-five mortality rate is 65 per 1,000 live births compared with fewer than 10 in most HICs, while maternal mortality remains 186 per 100,000 live births versus < 10 in HICs.

Physicians prioritized diagnostics (61.9%) and diseases with better prognoses (79.5%), underscoring the importance of early detection and cost-effectiveness in resource-limited environments. Comparable emphasis on diagnostics has been reported in Latin America and Qatar<sup>16,17</sup>. Although the questionnaire did not include explicit items on prevention, this theme emerged in physicians' qualitative comments, suggesting that preventive services should be integrated into diagnostic and treatment pathways as a sustainable policy approach.

Nearly all participants supported manpower expansion (97%) and infrastructure investment (95.3%). Similar evidence from Kenya, Iran, and Bangladesh shows that workforce expansion and facility strengthening improve outcomes<sup>18,19,20</sup>. In Pakistan, where the physician-to-population ratio is 1:1300 (below the WHO standard of 1:1000), closing human resource gaps will require targeted training, incentives for rural deployment, and strong public-private partnerships.

Equitable allocation (95.1%) was strongly endorsed, consistent with findings from Iran, Japan, and Malawi<sup>21,22,23</sup>. For Pakistan, this necessitates data-driven frameworks led by the Ministry of National Health Services and provincial departments. Allocation models should consider disease burden, geographic inequities, and transparent use of national survey data and digital platforms to ensure accountability<sup>24</sup>.

This study has several limitations. The use of convenience and snowball sampling, alongside recruitment through WhatsApp and other social media platforms, may have introduced selection bias and limited verification of respondent identity. The cross-sectional design precludes causal inference. Subgroup analyses by gender, age, or specialty were not undertaken owing to the limited and uneven sample distribution, thereby restricting the exploration of intergroup differences among physicians.

Despite these limitations, the combination of both quantitative and qualitative responses provided complementary insights. Notably, physicians highlighted prevention as an overlooked but essential aspect of resource allocation, a finding that future studies should explore more systematically. Overall, this study highlights urgent, system-level priorities for Pakistan: scaling investments in diagnostics, manpower, and infrastructure; embedding equity into allocation frameworks; and integrating preventive care and aligning policies with global UHC commitments. These findings provide evidence-based and actionable directions for policymakers seeking to bridge the gap between resource scarcity and equitable healthcare access.

## CONCLUSION

This study demonstrates that resource allocation in Pakistan is both an urgent challenge and a critical opportunity for reform. Physicians overwhelmingly reported that limited resources compromise patient care, delay chronic disease management, and widen inequities. To advance Universal Health Coverage, Pakistan must prioritize three strategic areas, such as strengthening the health workforce through training, equitable deployment, and retention, upgrading diagnostics and infrastructure to ensure timely, quality care, and embedding equity and prevention in allocation frameworks, ensuring rural and underserved populations are not excluded. Policymakers should also leverage public-private partnerships and digital health tools to optimize resource use, and explicitly align allocations with disease burden and international benchmarks. By translating physician insights into data-driven strategies, Pakistan can move toward an efficient, equitable, and resilient healthcare system that supports progress toward SDG-3.

**Acknowledgements:** We sincerely thank all the physicians who generously contributed their time and insights to this study. We are also grateful to the experts who reviewed and refined the questionnaire, ensuring its relevance and clarity. Finally, we acknowledge the valuable feedback from colleagues and peers who enhanced the quality of this research.

**Conflict of Interest:** The authors declare that there are no conflicts of interest relevant to the content of this manuscript.

**Funding:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

**Data Sharing:** The data supporting the findings of this study are available from the corresponding author upon reasonable request

## REFERENCES

1. Nouri S, Riahi L, Haji Nabi K, et al. Identifying key factors related to the resource allocation in the health sector of the Iranian oil industry: application of DEMATEL method. *Health Scope*. 2020;9(3):e97728.
2. Daniels N. Resource allocation and priority setting. In: Barrett DH, Ortmann LW, Dawson A, et al., editors. *Public health ethics: cases spanning the globe*. Cham: Springer; 2016.
3. Introducing Healthcare in Low-resource Settings. *Healthc Low-resour S* [Internet]. 2013 Jan. 24 [cited 2025 Nov. 30];1(1):e1. Available from: <https://www.pagepressjournals.org/hls/article/view/hls.2013.e1>
4. Hosseini Jebeli SS, Hadian M, Souresrafil A. Study of health resource and health outcomes: organization of economic corporation and development panel data analysis. *J Educ Health Promot*. 2019 Apr 24;8:70.
5. Healthcare in Low-resource Settings: the individual perspective. *Healthc Low-resour S* [Internet]. 2014 Oct. 17 [cited 2025 Nov. 30];2(2). Available from: <https://www.pagepressjournals.org/hls/article/view/hls.2014.4572>
6. Kieny MP, Bekedam H, Dovlo D, et al. Strengthening health systems for universal health coverage and sustainable development. *Bull World Health Organ*. 2017 Jul 1;95(7):537-9.
7. IKruk ME, Gage AD, Arsenault C, et al. High-quality health systems in the Sustainable Development Goals era: time for a revolution. *Lancet Glob Health*. 2018 Nov;6(11):e1196-252.
8. Duma D, Aringhieri R. Real-time resource allocation in the emergency department: a case study. *Omega*. 2023;117:102844.
9. Homauni A, Markazi-Moghaddam N, Mosadeghkhan A, et al. Budgeting in healthcare systems and organizations: a systematic review. *Iran J Public Health*. 2023 Sep;52(9):1889-901.
10. Bogale B, Scambler S, Mohd Khairuddin AN, et al. Health system strengthening in fragile and conflict-affected states: a review of systematic reviews. *PLoS One*. 2024 Jun 14;19(6):e0305234.
11. Khan SJ, Asif M, Aslam S, et al. Pakistan's healthcare system: a review of major challenges and the first comprehensive universal health coverage initiative. *Cureus*. 2023 Sep 4;15(9):e44641.
12. Raina N, Khanna R, Gupta S, et al. Progress in achieving SDG targets for mortality reduction among mothers, newborns, and children in the WHO South-East Asia Region. *Lancet Reg Health Southeast Asia*. 2023 Oct 29;18:100307.

13. Hayat K, Mustafa ZU, Godman B, et al. Perceptions, expectations, and experience of physicians about pharmacists and pharmaceutical care services in Pakistan: findings and implications. *Front Pharmacol*. 2021 May 14;12:650137.
14. Ministry of Finance, Government of Pakistan. Pakistan economic survey 2023–24: chapter 11 – health and nutrition [Internet]. Islamabad: Finance Division; 2024. p. 183–92. Available from: [https://finance.gov.pk/survey\\_2024.html](https://finance.gov.pk/survey_2024.html)
15. Debnath S. Integrating information technology in healthcare: recent developments, challenges, and future prospects for urban and regional health. *arXiv*. 2023 Jul 30. arXiv:2307.16296.
16. Bachelet VC, Osorio R, Silva-Villalobos D, et al. Exploring physicians' perception of diagnostic information in clinical practice. *Medwave*. 2023 Feb 22;23(1):e2665.
17. Waheed MA, Liu L. Perceptions of family physicians about applying AI in primary health care: case study from a premier health care organization. *JMIR AI*. 2024 Apr 17;3:e40781.
18. Okoroafor SC, Kwesiga B, Ogato J, et al. Investing in the health workforce in Kenya: trends in size, composition and distribution from a descriptive health labour market analysis. *BMJ Glob Health*. 2022 Aug;7(Suppl 1):e009748.
19. Tabrizi JS, Pourasghar F, Gholamzadeh Nikjoo R, et al. Status of Iran's primary health care system in terms of health systems control knobs: a review article. *Iran J Public Health*. 2017 Sep;46(9):1156–66.
20. Nuruzzaman M, Zapata T, Mclsaac M, et al. Informing investment in health workforce in Bangladesh: a health labour market analysis. *Hum Resour Health*. 2022 Oct 12;20(1):73.
21. Esmailishad B. Decision engineering in healthcare: how medical professionals prioritize resource distribution. *J Resour Manag Decis Eng*. 2022;1(1):10–6.
22. Nakahara S, Ichikawa M, Sakamoto T, et al. Strengthening the healthcare system in low- and middle-income countries by integrating emergency care capacities. *JMA J*. 2019 Sep 4;2(2):123–30.
23. McGuire F, Revill P, Twea P, et al. Allocating resources to support universal health coverage: development of a geographical funding formula in Malawi. *BMJ Glob Health*. 2020 Sep;5(9):e002763.
24. Freitas AT. Data-driven approaches in healthcare: challenges and emerging trends. In: Sousa Antunes H, Freitas PM, Oliveira AL, et al., editors. Multidisciplinary perspectives on artificial intelligence and the law. *Cham: Springer*; 2024. (Law, Governance and Technology Series; vol. 58).

© The Author(s) 2024. This is an open access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, and unrestricted adaptation and reuse, including for commercial purposes, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

To view a copy of this license, visit  
<https://creativecommons.org/licenses/by/4.0/>.