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From Crisis To Prevention: Documenting & Highlighting The Missing Role Of Architect In Post-Pandemic Healthcare Of Pakistan

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Article Details

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ABSTRACT

Role of Architect and his design towards enabling and optimization of healthcare facilities in critical. During Covid-19 pandemic, Pakistan major shortfalls in the existing healthcare system were highlighted with major gaps in integration of healthcare design experts and architects towards transformation of existing facilities to Covid-19 centers. In Post-pandemic Pakistan, there existed a strong need to evaluate how far the previous lessons learned have been incorporated in policy making and future design of facilities. The study explored 62 published documents related to healthcare facilities standards, requirements and functional development from provincial and federal government departments as the baseline exploration. Keywords were identified through recent research exploration of similar studies in post-pandemic timeline. The exploration showed that Architect term has been mentioned only 34 times in all of these documents with evidence based design and built environment as key words completely missing. The gaps highlighted shear differences and disconnect between healthcare policies and architectural design innovation in post-pandemic time. Research further argues the role of architect to be defined as a healthcare designer in the context to help optimize the facilities for future challenges through bridging these highlighted gaps and assisting Pakistan towards proactive preparation for future healthcare endeavors at large.

INTRODUCTION

When the COVID-19 pandemic struck, it brought several issues to lime light and hospitals had to rethink their design, infection controls and how adaptable they have to be for the future challenges (Ede et al., 2023). Healthcare facilities, built for routine efficiency and getting patients through quickly, were not ready for the large influx of patients in Covid-19 pandemic, different isolation restrictions or changed protection protocols that came with the corona virus based complications (Akhtar & Ramkumar, 2023). The pandemic showed that healthcare buildings should be flexible, scaleable and built using research to handle future health-related problems. Countries with well-developed health systems and followed WHO's and AIA's guidelines on hospital setup saw fewer issues in setting up isolation zones, air-flow and new hospitals though they did faced severe shortages of supplies and human resources (Kropf & Zeitz, 2022). Hospitals where healthcare design was outdated, were hit by major operational issues, packed waiting areas and an increase in hospital-acquired diseases and infections across the globe (Baig et al., 2022). This gap points out that healthcare buildings should change their design to protect against pandemics and future epidemics using ways such as flexible floor plans, advanced systems for cleaning air and more healthcare facilities spread across a region (Bhatti et al., 2024).

However in developing countries like Pakistan, which have already been constrained by poor funding, healthcare as a low priority for governments, rapid urbanization, poor socio-economic conditions and fragmented governmental framework with major gaps in functional optimization, pandemic jolted the overall healthcare infrastructure and capabilities highlighting a critical need to re-think, re-evaluate and re-visit the overall system with integration of design aspects towards future proof hospitals to manage unforeseen challenges in healthcare settings (Bhatti et al., 2023).

Since there has been a major gap in the post-pandemic healthcare system of Pakistan to evaluate how far the current system has incorporated these aspects through engaging or defining a clear role for the architectural design, architecture or architect, there existed a major gap towards an evaluation through existing published reports, SoP's, Guidelines and allied standards engaging healthcare system and its services delivery and management of the system itself (Bhatti et al., 2022). Since the healthcare system of Pakistan is a multifold, complex and multi-level integrated framework using both federal and provincial governmental resources as well a non-governmental resources, the current exploration focused on the major Provincial and Federal governing bodies associated with healthcare facility system delivery and its minimum standards to ensure the system bares the burden of disease at large.

In order to proceed ahead with research, two major research objectives were set forth:

1. To document the existing gaps in the explored governmental policies and guidelines in the post pandemic timeline.
2. To evaluate the impacts of these gaps on the role of architecture and its consequences towards future of healthcare design in Pakistan.

The research exploration identified some major gaps in the existing explored review of

published data with respect to the role of architecture in healthcare facilities and highlighted how these gaps may impact the future of these facilities in upcoming healthcare challenges in Pakistan.

REVIEW OF LITERATURE

Planning for healthcare has often been either piecemeal or completely ignored, budgets too low and there have been no set requirements for facility designs in Pakistan with focus on international standards integration in hospital and healthcare facilities design. It was discovered, before the COVID-19 pandemic, that many public hospitals were built according to old models that mostly focused on doing simple tasks through operational and functional requirements without any consideration for future unprecedented challenges which may rise at any time (Bhatti & Ghufran, 2020). Hence these aspects were mainly not on easing infection risk. Though there are many examples to be quoted, Jinnah Hospital in Lahore and Civil Hospital in Karachi experienced high volume of cases and usually operated at more than their regular optimum capacity, leading to problems for patients and increased risks of acquiring hospital-borne diseases and infections. Because there was no clear separation between areas for treatment of infections and other patients, it became even easier for cross-contamination to happen through nosocomial diseases. Owing to limited ventilation systems and little natural light in many hospitals built over the last 2-3 decades, airborne diseases spread more easily (Bhatti et al., 2023). Unfortunately it was also observed that healthcare facilities missed out on evidence-based design, giving no attention to research-informed designs that could help both patients and staff towards managing the burden of disease in these highly public focused facilities for needs of humanity in the time of crisis (Zahid et al., 2025).

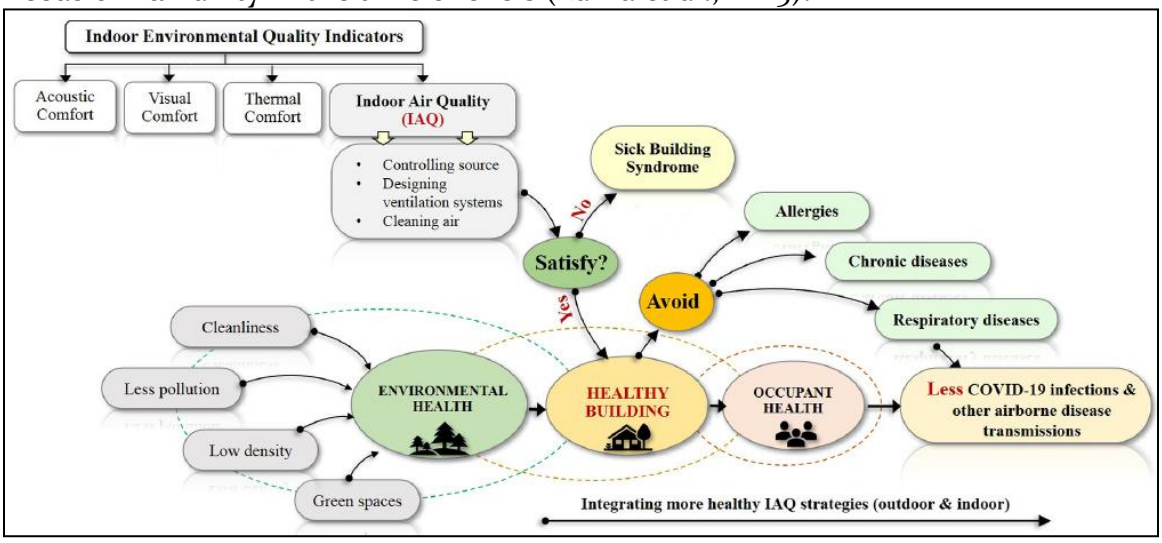

Figure 01 Relationship of environmental health & human health (Megahad et al., 2021)

When COVID-19 stuck the healthcare systems across the globe, Pakistan healthcare system was no exception. It laid bare the major weaknesses in the local health care system.

So many patients needed care at once that hospitals in Pakistan often lacked the extra capacity for those surges (Zahid et al., 2025). Emergency units became overburdened and because no separate areas for COVID-19 patients existed, hospital wards had to be hurriedly transformed into Covid-19 treatment areas and Covid-19 treatment centers, making everybody involved more at risk and prone to infections. Problems in the existing building designs of the hospitals made it difficult to maintain good infection control such as poorly managed ventilation and narrow areas that combined COVID-19 wards and patient corridors (Amran et al., 2022). The inflexibility of hospital layouts made it difficult for many countries to respond by building new ICUs, unlike in China and Western world, where they used modular constructions very fast. Because telemedicine services were not available at large previously in Pakistan, medical teams had to use digital tools they had not previously used or prior training was also not provided. Hence even with limited available technology, the challenges surpassed the capabilities and transformed into chaos at large (Megahed & Ghoneim, 2021).

At a global scale, Covid-19 appeared in end of 2019 and continued through 2022 onwards with multiple waves and variants across so far, spread worldwide and affected over 592 million people, with over 6.5 million people dying as a result (Chen et al., 2023). Despite the major effect the pandemic had, most post-pandemic construction projects used pre-existing plans and skipped the chance to change designs for common areas, open-plan offices and houses to reduce the spread of disease. Because of the pandemic, there is now a stronger need for future architecture that includes better ventilation (for example, modifying HVAC systems, using natural ventilation and installing HEPA filters), compartmentalized living areas, technologies that require no contact and nature-inspired design (Łukasik & Porębska, 2022). Issues in education, healthcare and the tourism industry led to the need for flexible and infection-resistant buildings and green spaces in cities were seen as important for improving mental and physical well-being (González et al., 2021). Yet, many sustainability rating systems do not consider health and epidemiological aspects which is why policy updates and applying universal design to buildings are needed to guarantee they support social, environmental and health goals during future pandemics (Meziani et al., 2022). Diversity in cultural thinking points out that these problems affect everyone and that combining different areas of expertise is necessary to succeed (Megahed & Ghoneim, 2021).

Big names in architecture such as OMA are now working on hospital design, even without specializing in healthcare which suggests people are seeing the need to rethink the field, mainly because of the COVID crisis. Several countries repurposed public locations as makeshift hospitals which underscores the value of future-ready designs that can be useful in asset management and built using BIM (Jaušovec & Gabrovec, 2023). Even so, the pandemic made it obvious that marginalized communities suffered the most because essentials like shelter and health are often neglected by existing systems. With this crisis, architecture has a chance to become more significant again by planning cities that are fair and resilient, mainly in the Global South, because sustainable and inclusive

recovery is necessary to address past events of justice (Jin et al., 2023).

Earlier in Pakistan and other developing countries, architects usually had to focus on saving money and keeping things basic which often resulted in designs that didn't work well for infection control or were difficult to change later on (Brambilla et al., 2021). Hospitals were built for today's purposes but not for possible future challenges or growth. But the pandemic brought changes to these architectural ideas, encouraging fast changes in healthcare buildings (Nadeem et al., 2022). The Covid-19 disease brought to light key weaknesses in healthcare everywhere and Pakistan's health services showed clear structural and design issues. Among the top problems was that architects and spatial design experts were not well involved in the process of changing healthcare facilities during the crisis (Aidarova & Aminov, 2021). Architecture usually plays a key role in making health spaces configurations more functional and optimized, preventing infections and managing flow, though architects in Pakistan were not given much of a say on how the pandemic should be managed.

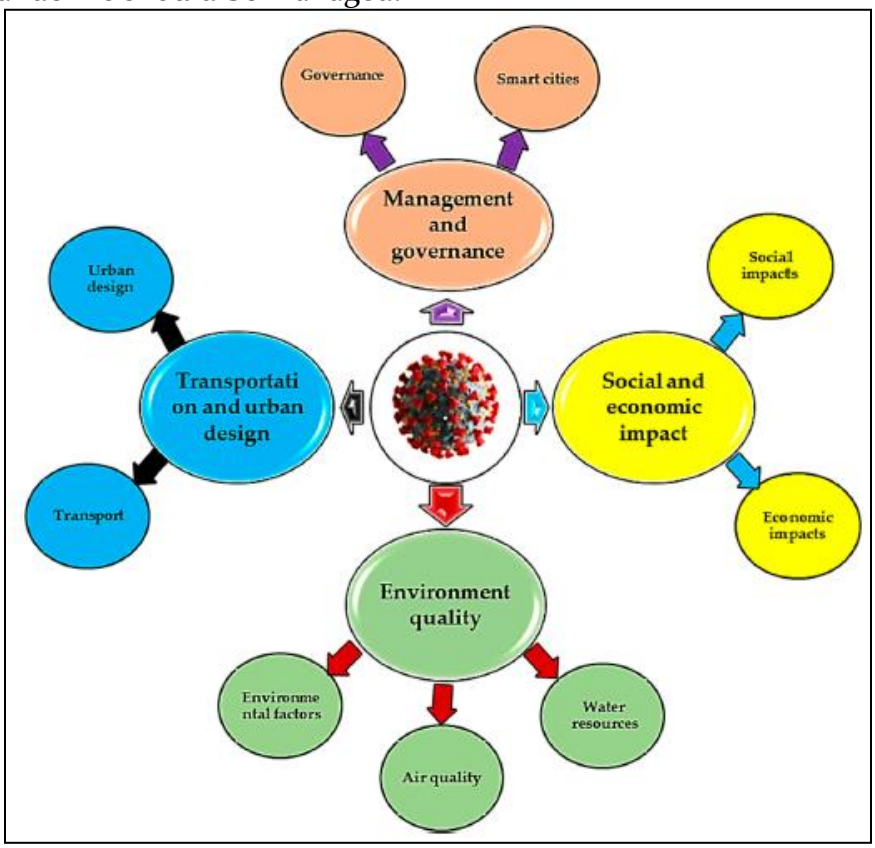

Figure 02 Impact on Covid-19 pandemic on managing municipalities (Amran et al., 2022)

An architect's education includes learning to conceive ideas that put health, optimized usage, adaptability and survival ahead in designing different buildings. When there is a pandemic, architecture needs to address making areas less risky for infection spread, encouraging positive emotions and managing any sudden spike in patients (França &

Ornstein, 2022). Around the world, architects, designers and town planners associated with health authorities opted to quickly revise and revisit public spaces: they changed sports halls into triage locations, set up modular units for intensive care and introduced air-purifying strategies to lessen the risk of the virus passing through the air. Still, in Pakistan, this potential was not fully used because of a divided system for overseeing healthcare, not enough collaboration between different professions and little recognition for architecture in public health crises (Bhatti et al., 2024).

After the pandemic, healthcare design now concentrates more on making healthcare facilities able to respond and endure. Nowadays, architects are thinking about designs that let buildings stay useful for daily functions while also defending against future health crises. They must develop structures that can handle more or less demand for patients. Many architectural designs for hospitals today have flexible walls, adaptable treatment rooms and placement of isolation units to be useful (Amran et al., 2022). Because of the pandemic, it was discovered that having enough medical supplies is very important; so, many designs now have detailed areas for storing and managing essential equipment which helps healthcare systems quickly increase operations in times of crisis (Sebastian & Ravishankar, 2022). Looking after the workers' mental health and well-being is now at the forefront. Because the challenges of the pandemic strongly affected health workers, it became obvious that spaces must encourage rest and relaxation. These adjustments in global context are still mainly ignored and have found to be missing in the context of Pakistan. Limited budgets, severe climate crisis, irregular utility services and a rising population are problems unique to the region which call for architects to be both creative and consider the project as a whole (Han et al., 2022).

It is important for architecture in Pakistan to change as the nation looks to the future. During the pandemic, it became clear that architects should be educated in designing spaces for healthcare, considering epidemiology, emergencies and how to link with public health agencies and transformation for unprecedented changes. Architects and experts in public health should unite and revamp the pandemic's lessons to make sure others can learn from them and apply them going forward.

RESEARCH METHODOLOGY

In order to proceed ahead with the existing exploration, research methodology was devised to define the line of action ahead to enable data flow and facilitate the information gathering towards defining how the set research objectives could be successfully achieved. Hence following below approach was used.

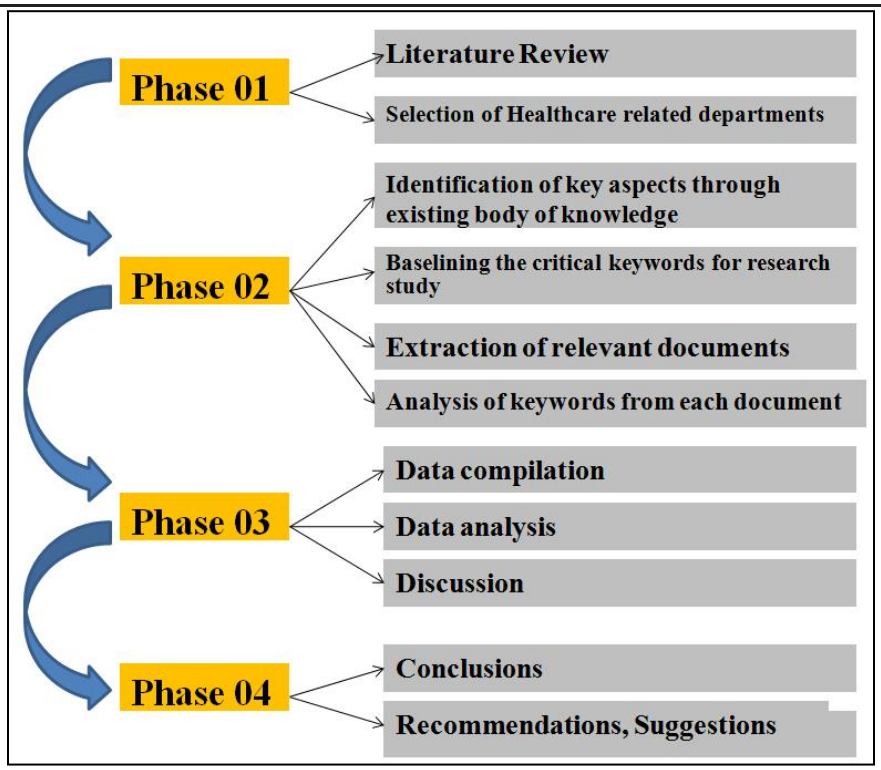

Figure 03 Overall Research Phases And Major Components

As evident above from the research methodology defined, the major steps and phases have been listed down. It focuses on identification on relevant departments of healthcare management and administration in governmental setup directly related and associated with managing healthcare settings including hospitals. Later on the basis of the review of literature, most relevant keywords and terms were explored using research publications highlighting the role of architects in the pandemic and post pandemic design of buildings. These keywords were later explored through multiple themes and hence resulted in identification of clarity in definition of the role of architects in design of healthcare facilities in Pakistan in both pre and post pandemic timelines.

DATA COLLECTION & ANALYSIS

As shared above, a detailed review of literature was explored to identify the keywords and help baseline the major critical themes. Google Scholar was used as the major source of research exploration with keywords as post pandemic architecture, pandemic architecture, role of architecture in Covid-19 pandemic, role of architects in healthcare transformations, etc. These help identified a major list of recent research publications highlighting the role of architects and architecture during the pandemic and how its has been defined in the post pandemic timeline. Based on the collected articles and their exploration, following below table of keywords based analysis was developed:

TABLE 01 MAJOR KEYWORDS, FREQUENCIES AND THEMES

S.No	Keyword	Frequency	Theme
1	covid-19	20	Healthcare
2	architecture	8	Design
3	healthcare facilities	6	Healthcare
4	pandemic	6	Healthcare
5	built environment	4	Environment
6	design	4	Design
7	urban design	3	Environment
8	covid-19 pandemic	3	Healthcare
9	flexibility	3	Other
10	hospital	3	Healthcare
11	resilience	3	Crisis & Recovery
12	design strategies	3	Design
13	hospitals	3	Healthcare
14	healthy cities	2	Environment
15	digital innovation	2	Technology
16	evidence-based design	2	Other
17	infection	2	Healthcare
18	control	2	Operations & Safety
19	buildings	2	Environment
20	healthcare	2	Healthcare
21	emergency	2	Crisis & Recovery
22	smart technologies	2	Technology
23	indoor air quality	2	Other
24	pandemics	2	Other
25	design thinking	2	Design
26	intensive care unit	2	Healthcare
27	residential planning and design	1	Other
28	green plant	1	Sustainability
29	hvac	1	Other
30	future hospital	1	Other

As shown above in the table 01, Keywords have been grouped into the following thematic categories:

1. Design: architecture, spatial adaptation, design thinking, strategies, human-centered design
2. Healthcare: COVID-19, hospitals, healthcare facilities, infection control, patient safety
3. Environment: built environment, urban design, climatic zones, healthy cities
4. Technology: digital innovation, smart technologies, BIM, simulation

5. Sustainability: energy conservation, sustainable healthcare buildings, green plant
6. Crisis & Recovery: resilience, emergency, disaster response, forecasting skills
7. Operations & Safety: control, evaluation, strategic decision-making
8. Other: Keywords not fitting neatly into the above categories

Based on the above analysis, a graphical evolution of the aspects were highlighted with top 20 keywords as shown below to focus the research on main role of architecture and architect theme.

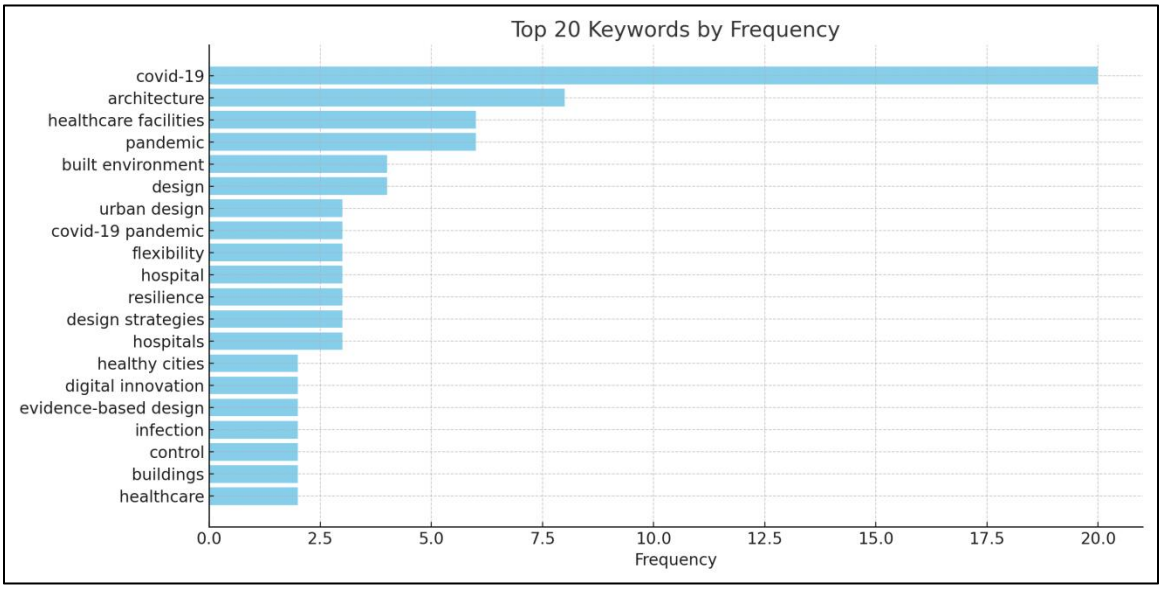

Figure 04 Bar chart of major keywords identified through frequency of usage

Later the above also helped to develop a pictorial representation of the data using keywords cloud word as shown below:

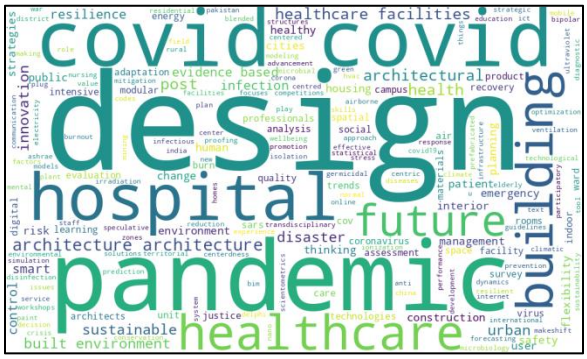

Figure 05 Keywords Cloud word

With identification of the most commonly used top 30 keywords, only most relevant to the study were kept forward for further analysis. The were based on the usage of these keywords with reference to role of architects and architecture in the design of healthcare settings as per explored in the review of literature. These mainly included covid-19, architecture, architect, healthcare facilities, pandemic, built environment, design, hospital, design strategies, evidence-based design and building/s.

As per defined research methodology, major related departments and allied applicable standards were identified related to healthcare and hospital services management and design. These mainly included the following as below:

1. Planning Commission of Pakistan (Key areas of new projects related to healthcare & allied)
2. Islamabad Healthcare Regulatory Authority.
3. Ministry of Health.
4. Balochistan Healthcare Commission.
5. Punjab Healthcare Commission.
6. KPK Healthcare Commission.
7. Sindh Healthcare Commission.

Hence each of their published data and documents in the form of reports, guidelines, acts, standards and SoP's were downloaded during the timeline of March, 2025 till June, 2025. The first three were mainly under the Federal Government of Pakistan while the last four were mainly governed by their respective provincial governments. The list of documents under each category are listed below in table 02.

TABLE 02 LIST OF DOCUMENTS FOR KEYWORD EXPLORATION

Selected Healthcare Documents Details	
S.No	**Documents**
	Planning Commission of Pakistan
1	Performa for Development Projects July 2011
2	Project Concept Note (PCN) Template 2024
3	PC-1 Form Revised 2005
4	PC-II Performa Revised 2024
5	PC-III Performa Revised 2024
6	PC-I Performa Revised 2024
7	PC-IV Performa Revised 2024
8	PC-V Performa Revised 2024
	Baluchistan
9	District Wise Types Government Health Facilities in Balochistan 2024
10	MINIMUM SERVICE DELIVERY STANDARD FOR BHU, RHC, THQ AND DHQ HOSPITALS
	Capital City - Islamabad
11	Notification - Islamabad Healthcare Regulatory Authority
12	STANDARDS BEST PRACTICES GUIDELINES 2017 FOR CARDIAC CATHETERIZATION LABORATORY (CCL)
13	Islamabad Healthcare Regulatory Authority MSDS for Hospitals - Revised 21st Arpil, 2025
14	Scoring Matrix to Assess Implementation of CCL Standards/ Best Practices

Guidelines 2017

15 Islamabad Healthcare Regulatory Authority Minimum Service Delivery standards for Clinical Labs

16 Islamabad Healthcare Regulatory Authority Dental Accreditation MSDS

17 Islamabad Healthcare Regulatory Authority Standards for Hospitals

18 Islamabad Healthcare Regulatory Authority Minimum Service Delivery Standards For Psychiatric & Addiction Treatment / Rehabilitation Facilities

19 Islamabad Healthcare Regulatory Authority Standard on Primary Healthcare Facilities

Ministry of Health

20 COVID-19 Vaccination PREP-Social and Gender Risks and Impact Assessment FINAL REPORT 2021

21 Islamic Republic of Pakistan Pandemic Response Effectiveness in Pakistan

Sindh

22 SINDH SERVICE DELIVERY STANDARDS FOR HOSPITALS

23 Sindh Service Delivery Standards for Clinics and Primary Health Care Facilities

Khyber Pakhtoon Khawa

24 Khyber Pakhtunkhwa Healthcare Commission (Establishment) Regulations, 2022

25 THE KHYBER PAKHTUNKHWA HEALTH CARE COMMISSION ACT, 2015.

26 Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards BHU

27 Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Cardiac Catheterization Laboratory

28 Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Homeopathic Clinics

29 Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Dental Clinics

30 Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards General Practitioner and Specialist Clinics

31 Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Radiology Iamging Diagnostics Centers

32 Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Collection Centers of Clinical Laboratories

33 Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Clinical Laboratories

34 Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Category 2B Healthcare Establishments

35 Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery

	Standards Category 2A Hospitals
36	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Category I Hospitals
	Punjab
37	Punjab Healthcare Commission Minimum Service Delivery Standards Dialysis Facilities
38	Punjab Healthcare Commission Minimum Service Delivery Standards Psychiatric/Addiction Treatment and Rehabilitation Facilities
39	Punjab Healthcare Commission Charter of Rights and Responsibilities Healthcare Establishments
40	Punjab Healthcare Commission Implementation Guidelines Standard and Indicators for Cardiac Catheterization Laboratory
41	Punjab Healthcare Commission REVISED GUIDELINES FOR DEVELOPMENT OF POLICIES / SOPs / PROCESSES OF CRITICAL PATIENT SAFETY AREAS
42	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Collection Centers Clinical Laboratories
43	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Emergency Departments of Hospitals
44	Punjab Healthcare Commission Minimum Service Delivery Standards Standardized Guidelines for Clinical Psychologists
45	Punjab Healthcare Commission Minimum Service Delivery Standards Hospital Waste Management Guidelines
46	Punjab Healthcare Commission Minimum Service Delivery Standards In-Vitro Fertilization Centers
47	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Eye Surgery Camps
48	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Prevention of Patients Fall
49	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Intensive Care Units / Critical Care Units
50	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Safe Injection Practices
51	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Safe Injection Practices
52	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Radiological / Imaging Diagnostics Centers
53	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Basic Health Units
54	Punjab Healthcare Commission Minimum Service Delivery Standards For Homeopathic Clinics

55	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Clinical Laboratories
56	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Dental Clinics
57	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Category 2C Healthcare Establishments
58	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual General Practitioners Family Physicians Specialist Clinics
59	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Category 2A Healthcare Establishments
60	Punjab Healthcare Commission Minimum Service Delivery Standards Hospitals
61	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Category 2B Healthcare Establishments
62	Punjab Healthcare Commission Minimum Service Delivery Standards Hospitals 2012

As evident from the table 02 above, a total of 62 documents were short listed from all the major selected departments related to healthcare and healthcare design and facilities management. There were 08 documents from the Planning Commission of Pakistan website, 02 from Baluchistan Healthcare Commission, 09 from Islamabad Healthcare Regulatory Authority, 02 from Ministry of Health, 02 from Healthcare Commission of Sindh, 03 from KPK Healthcare Commission and 26 from Punjab Healthcare Commission. Later keywords analysis against these selected documents was done. The basic analysis is shown below in table 03.

TABLE 03 KEYWORD ANALYSIS FOR SELECTED DOCUMENTS

Selected Healthcare Documents Details		Selected Keywords											
S.No	**Documents**	**covid-19 architecture**		**architect healthcare facilities**		**pandemic environment**		**design**	**hospital design strategies design**			**buildings**	**Total**
	Planning Commission of Pakistan												
1	Performa for Development Projects July 2011	0	0	0	0	0	0	0	0	0	0	0	0
2	Project Concept Note (PCN) Template 2024	0	0	0	0	0	0	1	0	0	0	0	1
3	PC-1 Form Revised 2005	0	0	0	0	0	0	10	0	0	0	2	12

4	PC-II Performa Revised 2024	0	0	0	0	0	0	6	0	0	0	6
5	PC-III Performa Revised 2024	0	0	0	0	0	0	1	0	0	0	1
6	PC-I Performa Revised 2024	0	0	0	0	0	0	12	2	0	0	3	17
7	PC-IV Performa Revised 2024	0	0	0	0	0	0	0	0	0	0	0	0
8	PC-V Performa Revised 2024	0	0	0	0	0	0	0	0	0	0	0	0
	Baluchistan												
9	District Wise Types Government Health Facilities in Balochistan 2024	0	0	0	0	0	0	0	0	0	0	0	0
10	MINIMUM SERVICE DELIVERY STANDARD FOR BHU, RHC, THQ AND DHQ HOSPITALS	0	0	0	1	0	0	0	16	0	0	4	21
	Capital City - Islamabad												
11	Notification - Islamabad Healthcare Regulatory Authority	0	0	0	0	0	0	0	2	0	0	0	2
12	STANDARDS BEST PRACTICES GUIDELINES 2017 FOR CARDIAC CATHETERIZATION LABORATORY (CCL)	0	0	0	0	0	0	1	7	0	0	1	9
13	Islamabad Healthcare Regulatory Authority MSDS for Hospitals - Revised 21st Arpil, 2025	0	0	0	0	0	0	0	0	0	0		0
14	Scoring Matrix to Assess Implementation of CCL Standards/ Best Practices Guidelines 2017	0	0	0	0	0	0	1	5	0	0	1	7
15	Islamabad Healthcare Regulatory Authority Minimum Service Delivery standards for Clinical Labs	0	0	0	1	0	0	2	1	0	0	1	5
16	Islamabad Healthcare Regulatory Authority Dental Accreditation MSDS	0	0	0	2	1	0	16	80	0	0	10	109
17	Islamabad Healthcare Regulatory Authority Standards for Hospitals	0	0	0	0	0	0	24	115	0	0	3	142
18	Islamabad Healthcare Regulatory Authority Minimum Service Delivery Standards For Psychiatric & Addiction Treatment / Rehabilitation Facilities	0	0	0	0	0	0	3	0	0	0	0	3
19	Islamabad Healthcare Regulatory Authority Standard on Primary Healthcare Facilities	0	0	0	5	0	0	1	2	0	0	0	8
	Ministry of Health												

20	COVID-19 Vaccination PREP-Social and Gender Risks and Impact Assessment FINAL REPORT 2021	176	0	0	4	32	0	5	27	0	0	0	244
21	Islamic Republic of Pakistan Pandemic Response Effectiveness in Pakistan	4	0	0	0	4	0	0	0	0	0	0	8
	Sindh												
22	SINDH SERVICE DELIVERY STANDARDS FOR HOSPITALS	0	0	0	0	0	0	8	229	0	0	3	240
23	Sindh Service Delivery Standards for Clinics and Primary Health Care Facilities	0	0	0	2	0	0	2	2	0	0	0	6
	Khyber Pakhtoon Khawa												
24	Khyber Pakhtunkhwa Healthcare Commission (Establishment) Regulations, 2022	0	0	0	0	0	0	0	1	0	0	0	1
25	THE KHYBER PAKHTUNKHWA HEALTH CARE COMMISSION ACT, 2015.	0	0	0	0	0	0	0	1	0	0	0	1
26	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards BHU	0	0	1	1	0	0	4	24	0	0	16	46
27	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Cardiac Catheterization Laboratory	0	0	0	0	0	0	1	30	0	0	16	47
28	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Homeopathic Clinics	0	0	0	1	0	0	8	23	0	0	18	50
29	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Dental Clinics	0	0	4	2	0	0	28	62	0	0	18	114
30	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards General Practitioner and Specialist Clinics	0	0	0	1	0	0	4	36	0	0	6	47
31	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Radiology Iamging Diagnostics Centers	8	0	4	2	0	0	36	72	0	0	16	138

32	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Collection Centers of Clinical Laboratories	7	0	0	0	0	0	4	6	0	0	3	20
33	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Clinical Laboratories	0	0	4	2	0	0	38	64	0	0	24	132
34	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Category 2B Healthcare Establishments	0	0	3	3	0	0	27	611	0	0	45	689
35	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Category 2A Hospitals	0	0	8	5	0	0	50	631	0	0	43	737
36	Khyber Pakhtunkhwa Healthcare Commission Minimum Service Delivery Standards Category I Hospitals	0	0	4	4	0	0	48	642	0	0	45	743
	Punjab												
37	Punjab Healthcare Commission Minimum Service Delivery Standards Dialysis Facilities	0	0	0	1	0	0	17	53	0	0	1	72
38	Punjab Healthcare Commission Minimum Service Delivery Standards Psychiatric/Addiction Treatment and Rehabilitation Facilities	0	0	0	3	0	0	51	43	0	0	16	113
39	Punjab Healthcare Commission Charter of Rights and Responsibilities Healthcare Establishments	0	0	0	0	0	0	0	0	0	0	0	0
40	Punjab Healthcare Commission Implementation Guidelines Standard and Indicators for Cardiac Catheterization Laboratory	0	0	0	0	0	0	1	21	0	0	0	22
41	Punjab Healthcare Commission REVISED GUIDELINES FOR DEVELOPMENT OF POLICIES / SOPs / PROCESSES OF CRITICAL PATIENT SAFETY AREAS	4	0	0	0	0	0	11	106	0	0	0	121

42	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Collection Centers Clinical Laboratories	0	0	0	0	0	0	0	0	0	0	0	0
43	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Emergency Departments of Hospitals	4	0	0	8	2	0	46	596	0	0	15	671
44	Punjab Healthcare Commission Minimum Service Delivery Standards Standardized Guidelines for Clinical Psychologists	0	0	0	0	0	0	6	11	0	0	0	17
45	Punjab Healthcare Commission Minimum Service Delivery Standards Hospital Waste Management Guidelines	1	0	0	6	0	0	24	285	0	0	4	320
46	Punjab Healthcare Commission Minimum Service Delivery Standards In-Vitro Fertilization Centers	0	0	0	0	0	0	1	8	0	0	5	14
47	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Eye Surgery Camps	0	0	0	2	0	0	11	6	0	0	1	20
48	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Prevention of Patients Fall	0	1	1	4	0	0	5	55	0	0	3	69
49	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Intensive Care Units / Critical Care Units	0	0	1	0	0	0	15	74	0	0	0	90
50	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Safe Injection Practices	1	0	0	0	1	0	0	26	0	0	0	28
51	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Safe Injection Practices	0	0	0	0	0	0	6	0	0	0	0	6
52	Punjab Healthcare Commission Minimum Service Delivery Standards Guidelines for Radiological / Imaging Disgnostics Centers	0	0	0	0	0	0	0	0	0	0	0	0

53	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Basic Health Units	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	Punjab Healthcare Commission Minimum Service Delivery Standards For Homeopathic Clinics	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Clinical Laboratories	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Dental Clinics	0	0	4	4	0	0	64	63	0	0	20	155		
57	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Category 2C Healthcare Establishments	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual General Practitioners Family Physicians Specialist Clinics	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Category 2A Healthcare Establishments	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	Punjab Healthcare Commission Minimum Service Delivery Standards Hospitals	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61	Punjab Healthcare Commission Minimum Service Delivery Standards Reference Manual Category 2B Healthcare Establishments	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	Punjab Healthcare Commission Minimum Service Delivery Standards Hospitals 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**205**	**1**	**34**	**64**	**40**	**0**	**599**	**4038**	**0**	**0**	**343**	**5324**		

As evident from the data shown above in the table 03, a total of 62 documents were explored using 10 keywords identified earlier. Total entries of keywords from these documents were mainly 5324 with Covid-19 reported 205 times, healthcare facilities 64

times, building/s 343 times, design 599 times and hospital 4038 times were reported. Architecture was reported only 1 time, architect was reported 34 times and pandemic was reported 40 times. However some of the keywords were not reported a single time i.e. Built environment, design strategies and evidence based design. The highest number of keywords reported from any major set of documents was 2765 from KPK Healthcare Commission followed by Punjab Healthcare commission documents 1718. The least keywords were reported from the documents set of Baluchistan Healthcare Commission i.e. 21 times only.

DISCUSSION

Based on the data collection done above and the overall outcomes of the 10 keywords analysis from the selected 62 documents, It became evident that role of architect or architecture has clearly not been highlighted, defined and signified at all as evident from figure 06 below. With respect to each set of documents from each department or governmental body is discussed below.

Most of the documents in the Planning Commission of Pakistan are administrative templates which include project performas (from PC-I to PC-V) and development project guidelines. These documents use no specialized healthcare terms and only mention "design" mostly (12 times in PC-I and 6 times in PC-II) as opposed to any other term. This implies that these templates are not made to fit the needs of different healthcare policy areas but are just general guidelines lacking any major relevance in the post pandemic scenarios. It was also highlighted that PC-IV, PC-V and the Performa for Development Projects do not match any healthcare infrastructure or pandemic planning keywords, showing their less significant relevance. Because "hospital," "healthcare facilities," or "covid-19" are not included, these documents are meant for regular bureaucracy or allied functional needs and not for handling needs in medical infrastructure. This highlights a critical gap where the post pandemic infrastructure or built environment transformation lacks any provision or consideration related to epidemic or inclusion of architecture as a mediator for any transformation in future.

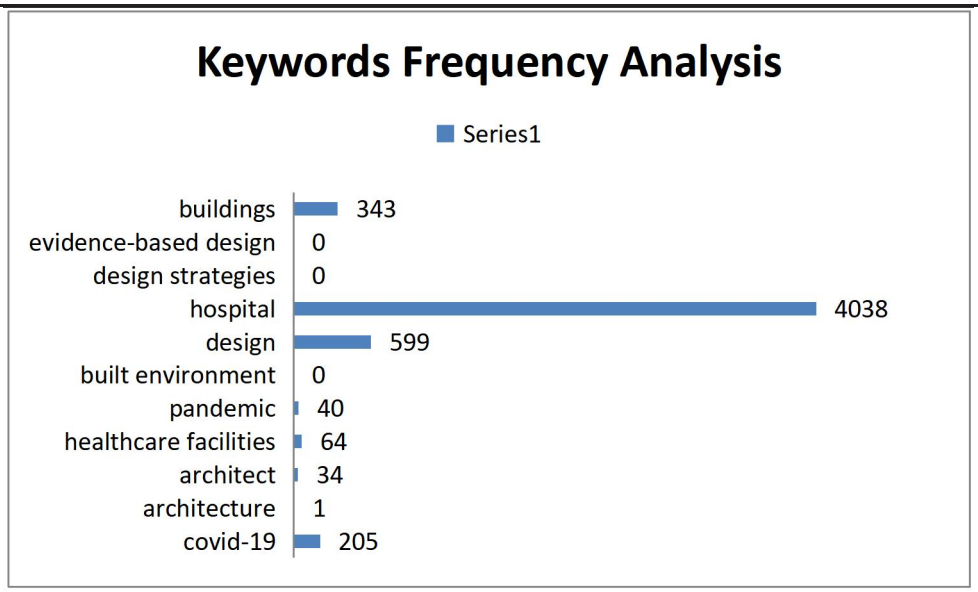

Figure 06 – Keywords Frequency Analysis

There is not much healthcare documentation based outcome from the documents set explored from Baluchistan Healthcare commission, as only two documents were reviewed. The document "District Wise Types Government Health Facilities in Balochistan 2024" has no keywords, so it appears to be just a directory, not a policy or design guideline. The other, "Minimum Service Delivery Standards for BHU, RHC, THQ and DHQ Hospitals," addresses 21 different keywords, mainly centered around "hospital" (16 times) and "healthcare facilities" (1 occurrence). But the lack of these terms suggests that the healthcare priorities in Baluchistan mainly address basic services and not innovative infrastructure or emergency plans. The narrow approach may be a result of deeper flaws in how healthcare is managed in the broader perspective.

Both the accreditation and other materials from the Islamabad Healthcare Regulatory Authority (IHRA) put great importance on how hospitals are built and the services they provide. An example is the "Standards for Hospitals" (Document 17) which refers to "hospital" 115 times and "design" 24 times and the "Dental Accreditation MSDS" (Document 16) which has 80 "hospital" mentions and 16 "design" references. But, as no document mentions covid-19, pandemic or built environment, it appears that IHRA is putting more emphasis on meeting standards than adapting to new challenges in healthcare settings. Clinical and dental standards seem to focus on "design" but not on evidence-based methods or ready-for-disaster ideas which may reflect a shortcoming in current healthcare awareness as well as proactive approach for future healthcare challenges as well.

The documents issued by the Ministry of Health mainly focus on pandemic response and this appears mostly in the "COVID-19 Vaccination PREP-Social and Gender Risks and Impact Assessment FINAL REPORT 2021" (Document 20) which contains 176 of the 205 "covid-19" mentions and 32 of the 40 "pandemic" references. "Pandemic Response

Effectiveness in Pakistan" includes only eight times reported for COVID-19, confirming that COVID-19 topics are not systematically merged with broader healthcare policies. Therefore, the Ministry has created specialized pandemic reports, yet much of this information is not currently informing standard healthcare policies which creates a gap between emergency response and standard regulations.

Sindh's healthcare records mostly involve hospitals, as is clear in the "Sindh Service Delivery Standards for Hospitals" (Document 22), where "hospital" is mentioned 229 times which is the second highest number in one document. Only 6 mentions of important keywords were found in "Service Delivery Standards for Clinics and Primary Health Care Facilities" (Document 23), meaning these types of healthcare units aren't given critical policy considerations. The fact that Sindh's rules mention neither "covid-19," "architecture," nor "built environment" means it is focusing on standard hospital systems and not considering more flexible or new ideas in its healthcare buildings.

KPK healthcare Commission documents are important because they are the richest in detail and keywords, mainly focusing on the design and structure of hospitals and clinics. As an example, "Minimum Service Delivery Standards for Category I Hospitals" (Document 36) contains 642 mentions of "hospital" and 48 mentions of "design." Another instance is "Clinical Laboratories Standards" (Document 33), where we find 38 connections to design and 24 to buildings, indicating how much attention was given to planning facilities. Very few pandemic-related terms are found, except for 8 mentions of "covid-19" in radiology standards (Document 31). The fact that KP talks about "design" and "buildings" a lot reveals that it is involved in healthcare infrastructure, but no mention of "evidence-based design" or "pandemic preparedness" suggests that it does not focus on modern issues in resilience.

The documents from Punjab present very evident contrasts—some are full of information and some have none. For example, the document "Minimum Service Delivery Standards for Emergency Departments" (Document 43) talks about "hospital" 596 times and "design" only 46 times. Another document was entitled "Hospital Waste Management Guidelines" (Document 45), with a total of 285 occurrences of the term "hospital." Among the 26 documents, 15 have no keyword matches (58%) which indicates they are not related to infrastructure or may be outdated. Punjab's documents do not include specific language for describing the pandemic, with just 9 references to 'covid-19' in all three documents. The main point of the case is the priority on hospitals and occasional highlighting aspects about design, both of which reflect overall national trends; the differences found in the documentation, however, underline the need for policy improvements.

It is evident that almost all the policies focus on the hospital industry and KP and Punjab have the most detailed documents but pay little attention to pandemic strength and modern challenges with inclusion of architecture as a redeemer. Baluchistan and Sindh do not offer a complete understanding of the issues, whereas Islamabad pays most attention to simply following and compliance of laws.

RESEARCH FINDINGS

The analysis of various healthcare documents from Pakistan's federal and provincial departments shows that, surprisingly, architectural and built environment elements are not fully considered in healthcare policy creation. Architecture and architect related terms were absent or present in minor numbers which reveals a major problem in linking design expertise to the planning of healthcare facilities during pandemics and afterwards. Planning Commission of Pakistan documents use generic administrative templates, talking about design only occasionally (e.g., twelve times in PC-I) and do not focus on healthcare architecture. Therefore, these frameworks are designed for generic infrastructure other than things like flexible hospitals and well-ventilated facilities needed now, exposing the country to more difficulty handling severe health crises. In Baluchistan, the healthcare documentation mainly covers just the basic standards of health services provided. Although Khyber Pakhtunkhwa (KP) and Punjab have more organized health records, they also have the same architectural issue. The inconsistencies in Punjab are very clear: some of its documents mention in detail about hospitals (Document 43 mentions "hospital" 596 times), but around 58% of its policies do not mention relevant keywords, possibly because they are not related to hospitals or have not been considered critical so far in the post pandemic time.

All these gaps highlighted reveal that governmental policies, frameworks and guidelines along with mentioned standards lack support for architects in the field of healthcare design. Focusing on hospitals alone in the debate excludes the important benefits of adaptive design, flexible layouts and natural elements which are key to pandemic resistance as well as in the post pandemic times with new healthcare challenges popping up. This gap is deeply concerning in a time after Covid-19, as making sure there's enough clean air, flexible space and good protection from infection is very important. Research suggests that including architectural insights in healthcare policy is now necessary, so that buildings are not only safe but also aid in preventing new health crises.

CONCLUSIONS

The findings from the research made it clear that there is a huge lack of architecture in shaping Pakistan's healthcare future and current infrastructure. Key terms like "architecture," "built environment," and "evidence-based design" were barely included or absent in most (62) of the reviewed policy and guideline documents. More often, policies cover hospital administration and only meet generic design guidelines, not considering how to prepare healthcare facilities for disasters. KP and Punjab's documentation speaks mainly of "hospital" and "design" but very little of "pandemic preparedness" or "bioclimatic design," meaning they seem to act only after problems have happened. Also, the Planning Commission's templates and Baluchistan's guidelines focus only on paperwork and rules, not on improving healthcare space and structure. In Islamabad, stringent accreditation rules favor permanent regulations rather than flexible solutions and the insights from Ministry

of Health's Covid-19 response do not play a significant role in making infrastructural changes. This failure to enforce rules is concerning now that being flexible, sustainable and optimized for health is essential. For this reason, policymakers ought to include architectural knowledge into planning for healthcare, as well as enforce proven design standards and make sure all infrastructure is in line with worldwide resilience expectations. The evidence highlights the need for architects and planners to become involved in healthcare policy to ensure the infrastructure is safe, useful for future generations, fair and keeps lives save in future healthcare challenges.

FURTHER RESEARCH DIRECTIONS

Based on the current exploration and the highlighted results from the analysis, it is proposed to evaluate and explore allied health related departments based documents and explore how these have been able to opt for the utilization of healthcare design and role of architect to manage these design based challenges in the healthcare settings of the current time as well as future. Based on these analysis and further exploration, it is proposed to develop a detailed recommendations for the future of healthcare design in Pakistan with defining role of architect and architecture to manage these gaps and help bridge them with their skillset and expertise.

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