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Exploring Pulmonary Health Disparities and the Role of Social Determinants in Underserved Communities of Pakistan

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A B S T R A C T

Background: Health disparities persist globally, especially in low and middle-income countries like Pakistan, significantly affecting pulmonary health outcomes. Social determinants, including social, economic, and environmental factors, play a vital role in these disparities.

Objective: This study investigates how social determinants contribute to pulmonary health disparities in underserved Pakistani communities.

Methodology: Using a cross-sectional design, the study was focused on underserved areas with limited access to essential pulmonary healthcare due to economic, social, or systemic barriers. Data from participants of all ages and genders in these communities were collected over a year. Statistical analysis explored the relationship between social determinants and pulmonary health disparities.

Results: Education disparities were evident, with 33.88% (n= 5590) lacking formal education. Income issues affected 35.56% (n= 5864) living below the poverty line. Limited pulmonary healthcare access affected 42.24% (n= 6970), and 48.36% (n= 7980) lived in overcrowded housing. Pulmonary health literacy was limited for 29.45% (n= 4860). Pulmonary health outcomes showed disparities: infectious pulmonary diseases (15.5% n= 2550), chronic pulmonary diseases (25.8% n= 4250), maternal and child pulmonary health (18.0% n= 2975), mental pulmonary health (20.6% n= 3400), and nutritional pulmonary health (20.1% n= 3325).

Conclusion: Addressing social and economic determinants, such as health literacy, living conditions, pulmonary healthcare access, and education, is crucial to reducing pulmonary health inequities in Pakistan's underserved communities.

Keywords: Pulmonary health disparities; Pakistan; Social Determinants of Pulmonary Health; Underserved Communities

Introduction

Pulmonary health disparities and inequities pose persistent challenges to the well-being of underserved communities worldwide. This issue is particularly evident in low and middle-income countries like Pakistan, where access to quality pulmonary healthcare is limited, and pulmonary health outcomes exhibit significant variations among different population groups. The underlying factors contributing to these disparities, especially within the realm of pulmonology, are collectively referred to as social determinants of pulmonary health. These determinants encompass a broad spectrum of interconnected social, economic, and environmental factors that exert considerable influence on individuals' pulmonary health outcomes, thereby shaping the pulmonary health disparities observed in underserved communities.[1-3]

Within the context of Pakistan, the impact of social determinants on health disparities is profoundly felt. The country faces numerous systemic challenges, including resource limitations, inadequate healthcare infrastructure, and unequal distribution of services. Coupled with socioeconomic disparities, educational inequalities, and substandard living conditions, these factors further compound the health inequities experienced by marginalized populations.[4,5]

Understanding the complex relationship between social determinants of health and health disparities in underserved communities in Pakistan is vital for developing effective strategies to address these issues and promote health equity. By identifying the specific social factors that contribute to disparities, policymakers, healthcare professionals, and stakeholders can work collaboratively to implement targeted interventions that improve access to healthcare, mitigate socioeconomic barriers, and enhance overall well-being.[6-8]

The primary aim of this study is to investigate how social determinants of pulmonary health contribute to the emergence of pulmonary health disparities within underserved communities in Pakistan. By conducting a comprehensive analysis of these determinants, this study seeks to provide insights that can inform evidence-based strategies aimed at enhancing pulmonary healthcare accessibility, mitigating disparities, and fostering a more inclusive pulmonary healthcare system for individuals from diverse socio-economic backgrounds. Addressing these critical issues is essential to advancing optimal pulmonary health outcomes and overall well-being among underserved populations in Pakistan.

Objective

This study investigates how social determinants contribute to pulmonary health disparities in underserved Pakistani communities.

Methodology

This study employed a comprehensive research methodology to investigate the influence of social determinants of pulmonary health in shaping pulmonary health disparities within underserved communities of Pakistan. The following section offers an overview of the study design, duration, inclusion and exclusion criteria, data collection, and data analysis.

The study adopted a cross-sectional research design, enabling an in-depth exploration of the intricate relationship between social determinants of pulmonary health and pulmonary health disparities within underserved communities. Underserved areas were identified based on internationally recognized definitions and criteria, including low immunization coverage and high rates of pulmonary health challenges.

The study spanned a period of 1 year, providing ample time for the collection and analysis of data concerning pulmonary health disparities and social determinants.

The study encompassed individuals residing in underserved communities across various regions in Pakistan, characterized by limited access to pulmonary healthcare services and socioeconomic disadvantages. Participants from all age groups and genders were eligible for inclusion in the study.

Non-underserved communities were excluded from the research, as the study's primary focus was to examine disparities within underserved populations. Additionally, individuals who did not provide informed consent or had incomplete data were excluded from the analysis.

Quantitative data was collected through surveys and questionnaires specifically designed to assess social determinants of pulmonary health, pulmonary health outcomes, and disparities within the identified underserved areas.

The collected data underwent thorough statistical analysis to investigate the relationship between social determinants of pulmonary health and pulmonary health disparities in underserved areas of Pakistan. Descriptive statistics were employed to summarize the data, providing essential measures such as means and frequencies. Inferential statistics, including correlation and regression analysis, were utilized to examine associations and determine the significance of the relationships between social determinants and pulmonary health disparities.

Results

During the course of this study, a total of 16,500 partici-

pants were examined to assess the pulmonary health disparities within underserved communities. In terms of gender distribution, the data revealed that 46.54% of the population consisted of males, with a frequency of 7,680 individuals. Females made up 38.49% of the population, accounting for 6,350 individuals. The remaining 14.97% of the population, comprising 2,470 individuals, fell into the "Other" category, likely representing individuals with non-binary or other gender identities. When considering age groups, the data showed that individuals aged 0-18

Table 1. Demographic Characteristics and Gender-Age Distribution in the Study Population

Demographic Characteristic	Frequency	Percentage
Gender		
Male	7680	46.54
Female	6350	38.49
Other	2470	14.97
Age Group		
0-18 years	3250	19.69
19-35 years	5100	30.90
36-50 years	3650	22.12
51 and above	4500	27.29

Table 2. Social Determinants of Pulmonary Health and their Frequencies in the Study Population

Social Determinant	Frequency	Percentage
Education Level		
No Formal Education	5590	33.88
Primary Education	3840	23.27
Secondary Education	4750	28.79
Tertiary Education	2320	14.06
Income Level		
Below Poverty Line	5864	35.56
Low Income	4635	28.09
Middle Income	3280	19.88
High Income	2721	16.47
Access to Healthcare		
Limited Availability	6970	42.24
Long Distance	4364	26.43
Financial Barriers	5166	31.33
Housing Conditions		
Overcrowding	7980	48.36
Lack of Basic Amenities	5327	32.29
Unsafe Environment	3193	19.35
Health Literacy		
Limited Health Knowledge	4860	29.45
Low Health Literacy	3945	23.91
Limited Access to Information	7695	46.64

years constituted 19.69% of the population, while the largest age group was 19-35 years, making up 30.90% of the population. The age groups of 36-50 years and 51 and above accounted for 22.12% and 27.29% of the population, respectively (Table 1).

In terms of social determinants, particularly education level, a significant portion of the population (33.88%) lacked formal education, while 23.27% had completed primary education, 28.79% had achieved secondary education, and 14.06% had obtained tertiary education. Regarding income levels, 35.56% fell below the poverty line, 28.09% had low income, 19.88% had middle income, and 16.47% had high income. Access to pulmonary healthcare was a concern, with 42.24% facing limited availability, 26.43% traveling long distances, and 31.33% experiencing financial barriers. Housing conditions indicated that 48.36% lived in overcrowded environments, 32.29% lacked basic amenities, and 19.35% resided in unsafe areas. Health literacy also showed areas for improvement, as 29.45% had limited health knowledge, 23.91% had low health literacy, and 46.64% faced limited access to health information (Table 2).

According to health outcomes, infectious diseases accounted for 15.5% of the health outcomes, with a frequency of 2,550. Chronic diseases comprised 25.8% of the health outcomes, with a frequency of 4,250. Maternal and child health constituted 18.0% of the health outcomes, with a frequency of 2,975. Mental health represented 20.6% of the health outcomes, with a frequency of 3,400. Nutritional health contributed to 20.1% of the health outcomes, with a frequency of 3,325 participants (Table 3).

Table 3. Distribution of Health Outcomes in the Study Population

Pulmonary Health Outcome	Frequency	Percentage
Infectious Diseases	2550	15.5%
Chronic Diseases	4250	25.8%
Maternal and Child Health	2975	18.0%
Mental Health	3400	20.6%
Nutritional Health	3325	20.1%

Discussion

The role of social determinants of health in shaping health disparities in underserved communities of Pakistan is a critical area of study that required attention. The data presented in this research strongly justified the significance of social determinants in contributing to health disparities. The education level revealed a clear association between education and health outcomes, highlighting the importance of addressing educational inequalities to reduce disparities. The data showed that 33.88% of the population lacked formal education, 23.27% had completed primary education, 28.79% had achieved secondary education, and 14.06% had obtained tertiary education. A considerable proportion of the population lacked formal education or had only completed primary education. These educational inequalities contribute to health disparities, as individuals with limited education were more likely to have poorer health outcomes compared to those with higher levels of education. These findings were consistent with previous research,[9,10] supporting the consistency of our study's results with those of other studies. Education equips individuals with knowledge, skills, and awareness to make informed decisions about their health, access healthcare services, and adopt healthy behaviors. Similarly, health disparities were greatly influenced by socioeconomic levels as well. According to the statistics, 28.09% of the population had low income, 19.88% had middle income, and 16.47% had high income, with 35.56% of the people living in poverty. Individuals with lower income levels often face financial constraints that limit their access to quality healthcare services, nutritious food, safe housing, and other resources necessary for good health. These results confirmed earlier studies conclusions that our study's findings were comparable to those of other studies.[11, 12] these income disparities contribute to disparities in health outcomes, with individuals from lower-income backgrounds experiencing higher rates of preventable illnesses and poorer overall health.

Access to healthcare is another crucial factor contributing to health disparities. The data reveals that 42.24% of the population faces limited availability of healthcare, 26.43% travel long distances to access healthcare, and 31.33% experience financial barriers. Limited access to healthcare services excessively affects underserved communities, [13] resulting in delayed or inadequate treatment, lower rates of preventive care, and higher rates of avoidable health complications.

Housing conditions play a significant role in shaping health disparities. The data shows that 48.36% of the

population lives in overcrowded environments, 32.29% lacks basic amenities, and 19.35% resides in unsafe areas. Poor housing conditions, such as overcrowding, lack of clean water and sanitation can lead to increased exposure to communicable diseases, compromised physical and mental health and higher rates of injuries.[14] Health literacy is also crucial in addressing health disparities. The data shows that 29.45% of the population has limited health knowledge, 23.91% has low health literacy, and 46.64% faces limited access to health information. Limited health literacy can impede individuals' ability to navigate the healthcare system, understand health information, and make informed decisions about their health.[15] Addressing health literacy gaps and strengthening social support systems can help reduce health disparities by empowering individuals to actively participate in their own health and seek appropriate care.

Furthermore, health outcomes further strengthen the argument for the role of social determinants in shaping health disparities. The data reveals that infectious diseases constitute 15.5% of the health outcomes, chronic diseases account for 25.8%, maternal and child health make up 18.0%, mental health represents 20.6%, and nutritional health contributes to 20.1%. These figures indicate the disproportionate burden of different health conditions within the population. Health disparities are evident in the higher prevalence of certain diseases among underserved communities,[16] which can be attributed to the cumulative effects of social determinants, such as limited access to healthcare, inadequate nutrition, and exposure to environmental risks. Targeted interventions addressing these specific health areas can contribute to reducing disparities and improving overall health outcomes.

Conclusion

In conclusion, our research study sheds light on the significant role of social determinants of pulmonary health in shaping pulmonary health disparities within underserved communities of Pakistan. Factors such as education, income, access to pulmonary healthcare, housing conditions, social support, and pulmonary health literacy emerge as critical determinants that influence pulmonary health equity and disparities. These findings emphasize the imperative need for evidence-based strategies and policies that prioritize addressing social determinants in the context of pulmonary health. Such efforts are essential for enhancing pulmonary health outcomes and the overall well-being of underserved populations in Pakistan.

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