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Epidemiological Trends of Diabetes in Urban Pakistan: Evidence of a Growing Public Health Crisis

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ABSTRACT

Diabetes is now a major health issue caused by urbanization in Pakistan. Urban residents are especially affected by the significant rise in the number of people with diabetes or pre-diabetes due to rapid urbanization, as well as changes in their lifestyle and diet as a result of population growth and other demographic shifts. Urbanized locations are still experiencing high levels of undiagnosed diabetes and are at risk for many lifestyle-related diseases such as obesity, hypertension, and diabetes, which together create significant problems for their healthcare systems, including increased expenses associated with treating diabetes-related complications and issues with maintaining the ability to provide adequate diabetic healthcare services due to increased costs. This rapid increase in incidence has created a very urgent need for effective prevention measures, early detection, and enhancement in primary healthcare delivery systems.

Keywords: Diabetes Mellitus, Urban Population, Epidemiology, Pakistan, Non-Communicable Diseases, Public Health Crisis

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Introduction

As a global non-communicable disease, diabetes mellitus is being seen with increasing frequency as an epidemic, especially among low-to-middle-income countries(1). Pakistan is one of these countries and is also experiencing a transition in its overall public health from the predominance of communicable diseases towards the predominance of non-communicable diseases. Diabetes is a major contributor to morbidity and mortality, especially in urban areas, and has created additional financial strains on Pakistan's health care system. Rapid urbanization has resulted in this same combination of rapid population growth in major urban centers in Pakistan (e.g., Karachi, Lahore, Islamabad, Rawalpindi, Faisalabad, etc.) and rapid economic development associated with burgeoning industrialization and migration of people from rural to urban areas(2). The overall effect has been that there is now a large population density in these cities, inadequate housing and too many demands placed on the country's health care system. The rapid shift to an urban lifestyle has increased the risk factors associated with diabetes(3). Sedentary employment patterns, a high intake of processed foods and calorie-dense foods, a lack of physical activity, and increased psychosocial stress have contributed to higher rates of obesity, insulin resistance, and metabolic syndrome. Therefore, diabetes prevalence is significantly higher in urban populations; however, the majority of people with diabetes are undiagnosed or have poorly controlled diabetes(4)These trends indicate that Pakistan's urban areas have a need for integrated strategies that emphasize the prevention, early detection, and treatment of diabetes in the context of the rapid growth of Pakistan's urban population.

Urbanization and Population Transitions in Pakistan:

In Pakistan, growth resulting from industrialization and economic growth has caused cities such as Karachi, Lahore, Islamabad, Rawalpindi, and Faisalabad to grow rapidly with few urban plans or controls. Overcrowding, inadequate residential housing, and pressure on health services have resulted from urban growth without planning. Urban population characteristics are very dissimilar to those of rural populations due to differences in health and environment. Urban lifestyles will have large populations of older adults who are highly susceptible to chronic diseases when compared to rural populations. Socioeconomic disparities will compound the risk of health problems among poor people living in urban areas. Urban lifestyles (Sedentary employment, increased use of all forms of transportation, Nutritional, dietary, and environmental stress, limited opportunities for recreational activities) lead to a growing trend in deaths from diabetes, hypertension, and obesity; while rural Areas have a growing rate of undernutrition and communicable diseases (5).

Diabetes in Urban Areas of Pakistan

Geographical Distribution

The increasing incidence of diabetes in urban parts of Pakistan is very frightening, according to studies conducted by the National Diabetes Survey of Pakistan (NDSP)(6)**.** Many studies conducted in large cities such as Karachi, Lahore, and Rawalpindi indicate that trustingly, up to **30%** of the adult population may be suffering from either diabetes or impaired glucose regulation without ever being diagnosed. Urban living combined with sedentary lifestyles and the lack of physical activity has put many residents at risk due to excess weight and unhealthy eating habits. Many of the studies that have been performed on diabetes in these major cities have demonstrated that there is a high rate of undiagnosed diabetes cases. Poor education regarding diabetes and delayed diagnosis lead to more health problems, more complications from the disease, and an increase in the healthcare costs associated with treating these health conditions.

Trends Over Time

The dramatic rise in diabetes incidence over the last two decades in urban areas of Pakistan is largely due to changes in lifestyle, food habits, and obesity (epidemic)**.** It was previously reported by other studies that diabetes was at a lower rate of growth, but now there have also been reports of higher rates of new diagnoses in the 30s age group. The earlier diagnosis has a corresponding increase in total duration of illness and increased complications as diabetes continues to develop, resulting in increased demands on health care. In addition, the increasing prevalence of pre-diabetes in urban areas is poised to drive up the number of new cases of diabetes requiring preventive treatment interventions.

Factors Contributing to the Urban Diabetes Epidemic

Lifestyle, Behavior, and Sedentary Activity Factors

Lifestyle and behavioral factors are the most significant contributors to the growing urban diabetes epidemic within Pakistan. As individuals living in urban areas continue to be more sedentary than previous generations due to their increasing use of desk jobs, screen time, and reliance on motorized transport instead of walking or riding bicycles, little time is spent by urban dwellers actually walking or riding bicycles. With changes in urban diets towards increased amounts of processed food, fast food, and an increasing number of added sugars, especially amongst younger generations, the combination of low levels of physical activity and these dietary habits results in a significant increase in caloric consumption/weight gain, a disruption in glucose metabolism, and very high risks of developing type 2 diabetes**.**

Metabolic and Clinical Risk Factors

In urban regions of Pakistan, diabetes is strongly influenced by central obesity, insulin resistance, inactive lifestyle patterns, and genetic vulnerabilities. Cultural attitudes towards physical activity also contribute to the increased risk of diabetes among women in urban Pakistan, as do the growing levels of obesity, hypertension, and dyslipidemia in these populations. In addition, the common prevalence of South Asian genetic predisposition and the lifestyle characteristics associated with living in urban centers increase the risk of type 2 diabetes. As shown in table no .1

Table 1: Key Aspects of Diabetes as a Public Health Issue in Urban Pakistan

Aspect	Description	Urban Evidence	Public Health Implication	Supporting Indicator	References
Urbanization	Rapid growth of major cities	Karachi, Lahore, and Islamabad are growing rapidly	Increased exposure to diabetes risk factors	High population density	(2)
Demographic transition	Changes in age, income, and education	More middle-aged and older adults in cities	Higher vulnerability to chronic diseases	Aging urban population	(1)
Diabetes prevalence	Overall burden of diabetes	Higher prevalence in urban vs rural areas	Indicates an urban health crisis	NDSP findings	(6)
Undiagnosed diabetes	Unrecognized disease burden	A large proportion of urban cases are undiagnosed	Delayed treatment and complications	Low screening coverage	(4)
Trends over time	Changes in prevalence	Steady increase over the last two decades	Future escalation of burden	Rising incidence rates	(6)
Age of onset	Change in affected age groups	Younger adults are increasingly affected	Longer disease duration	Early-onset diabetes	(4)
Lifestyle factors	Behavior-related risks	Sedentary life, unhealthy diets	Preventable risk exposure	Low physical activity	(3)
Metabolic risk factors	Clinical contributors	High obesity and hypertension rates	Increased complications	Central adiposity	(5)
Health system challenges	Gaps in care delivery	Overburdened urban facilities	Poor disease management	Fragmented services	(1)
Economic & health impact	Overall burden	High healthcare costs and productivity loss	Strain on the health system	DALYs attributable to diabetes	(3)

Socioeconomic and Environmental Factors

In urban Pakistan, socioeconomic conditions and environment are significantly affecting diabetes risk(5). Low-income families tend to eat very inexpensive, energy-dense foods because they do not have access to fresh produce. In addition, the large number of fast-food restaurants in urban areas promotes unhealthy diets. Urban workers generally work very long hours, on insecure jobs, with many employees experiencing stress and poor sleep as a result. All of these things increase an individual's risk of developing metabolic disease (i.e., diabetes). Also, people have very limited access to safe places to exercise, such as walking paths, parks, and recreational areas; therefore, they do not have the opportunity to exercise regularly. All of these dietary, environmental, and lifestyle factors are major contributors to the increase in diabetes in urban areas throughout Pakistan.

Disability & Other Secondary Conditions Related to Diabetes

In urban Pakistan, diabetes is a major source of illness and death; cardiovascular disease is the most frequent cause of death among diabetic patients. Diabetes complications caused by chronic high blood sugar include neuropathy, retinopathy, and nephropathy, which decrease quality of life and increase the use of health services. These complications can increase the number of disability-adjusted life years (DALYs) lost, with the greatest impact occurring in the working-age population residing in urban areas. Decreased productivity and higher rates of absenteeism caused by these complications represent a significant drain on both individual families and society, providing an example of the significant social and economic consequences of the diabetes epidemic faced by the urban areas of Pakistan.

Health System Challenges in Urban Pakistan

Urban health systems in Pakistan are faced with innumerable obstacles in response to the growing prevalence of diabetes. Many urban health systems do not have screening and early diagnosis programs to appropriately identify diabetes in a timely manner. In addition, urban government-funded health care systems suffer from poor staffing levels, extensive backlogs and little to no access to the diagnostic and medication resources necessary for patient care. The care received by patients with diabetes in the private sector is primarily uncoordinated and extremely inconsistent in relation to the cost and quality of care. Many patients have appointments with different providers and do not receive the same level of care or treatment to address their diabetes.

Evidence Enclosing Diabetes as a Public Health Crisis

As highlighted above, diabetes is clearly a public health crisis in the urban areas of Pakistan, given the combination of high levels of prevalence, rapid increases, early onset of the condition, and the resulting economic burden. As compared to the global and regional trends, Pakistan is among the countries with the most rapidly increasing burdens of diabetes. It is projected that without effective interventions in place, the diabetes burden will continue to rapidly grow to an unsustainable level and have a lasting negative impact on Pakistan's health care systems and socioeconomic growth.

Policy Implications and Public Health Interventions

Preventive approaches against diabetes in urban populations within Pakistan must be comprehensive and specifically developed for their respective urban centers. The design and implementation of community-based screening and educational programs targeting early recognition and reduction of risk factors associated with diabetes will aid in achieving this goal. The implementation of lifestyle change initiatives such as physical activity and healthful eating should also be supported by increasing access to programs that improve both the physical and the social environment. The capacity of primary healthcare systems must be strengthened in order to manage the problems of diabetes effectively. Multisectoral policies that include health, urban planning, education, and transportation are required to create an environment conducive to healthy living.

Research Gaps and Future Guidelines

While evidence is growing on the prevalence and risk factors for diabetes, many significant gaps in research still exist. Longitudinal studies of urban cohorts are very few and therefore limit our understanding of the progression and risk factors of diabetes. In addition, greater focus is needed on the establishment of city-level surveillance systems to monitor the trends in diabetes and guide the creation of effective interventions. Underrepresented in the current literature are marginalized urban communities, and current evaluations of the interventions in use have not been conducted sufficiently to determine the interventions' effectiveness. Bridging these gaps in research is essential for creating a scientific basis for creating public policy that will be sustainable and effective in controlling diabetes.

Conclusion

Epidemic proportions of diabetes mellitus exist in urban Pakistan. Rapid urbanization, lifestyle changes, and the economic development process, in large part, account for the increase in the proportion of people with diabetes mellitus or pre-diabetes when compared to the rural community in Pakistan. There is a significant number of unidentified diabetics, and there are several cases that present with poor glycemic control that consequently develop into early problems, consequently placing both a health burden and a financial burden on the health system. Current health services in urban areas of Pakistan are insufficient to meet the emerging needs of the urban population. Without timely intervention, the number of cases, disease complications, number of deaths, and the costs associated with diabetes mellitus will continue to rise. Diabetes mellitus needs to be addressed as a critical public health priority in urban areas of Pakistan through effective prevention programs, strengthening primary care, and using strategies.

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