

REGIONAL DIFFERENCES IN HEPATITIS B AND C PREVALENCE IN PAKISTAN: TRENDS, CHALLENGES AND FUTURE DIRECTIONS – A REVIEW

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Abstract

Hepatitis B (HBV) and Hepatitis C (HCV) are important public health issues in Pakistan, with unique regional patterns and issues that influence their prevalence and control. Though HBV is vaccine-preventable, it still infects some groups because of incomplete immunization coverage, particularly the timely delivery of the birth dose, and has high regional heterogeneity. HCV, on the other hand, is not yet vaccinated against and has a much greater prevalence in the country, especially in rural and underserved areas, and renders Pakistan one of the countries with the highest HCV burden in the world. Socioeconomic factors like poverty, low literacy, and poor access to healthcare increase susceptibility to the two diseases, while unsafe injection practices, unregulated blood transfusions, and traditional barbering are cultural practices that increase the transmission of the viruses. Despite government programs having increased HBV vaccination coverage and opened up HCV treatment access, equitable access and regulation of healthcare practice continue to be a challenge. Economic constraints hinder the universal application of prevention and treatment measures, and cost-effective and region-specific interventions become a mandatory priority. Recent trends show progress in HBV control among children and increased availability of HCV treatments, but persistent unsafe practices and inadequate awareness continue to impede disease elimination. Future directions should focus on universal HBV vaccination at birth, expanded HCV screening and treatment, and targeted public health education, alongside robust policy enforcement and healthcare system strengthening. Addressing regional disparities and integrating socioeconomic and cultural considerations will be critical for effective hepatitis control and eventual elimination in Pakistan.

INTRODUCTION

Hepatitis B and C continue to be important public health issues in Pakistan, with high regional variation in prevalence rates. Heterogeneity of the epidemiologic pattern of these viral diseases can be explained by various socio-economic, behavioral, and cultural determinants that vary exceptionally between provinces. As per 1, Pakistan's hepatitis C virus (HCV) epidemic is a classic example of overall stability in prevalence throughout the nation, reflecting an ominous trend in the sense that over the last three decades, no decline has been shown. Such homogeneity of HCV prevalence, especially high rates among people who inject drugs (PWID) and other high-risk groups, requires immediate public health interventions to address these differences effectively.⁽¹⁾

It is also important to know the general conditions under which the high prevalence of hepatitis B and C infection occurs to devise effective prevention strategies. In the high prevalence areas, the lack of access to the health system, inadequate education regarding modes of transmission, and inadequate preventive interventions all contribute to chronic rates of infection. The general prevalence of HCV genotype 3 in all the provinces makes it difficult to eradicate, and it suggests the need for region-specific treatment strategies that accommodate regional idiosyncrasy. Public health officials suggest that it is overdue to carry out a broad national survey of HCV infection, and it would permit strategy refinement towards transmission reduction and enhanced access to treatment. Scalable interventions are also needed to enable Pakistan to achieve its goal of eliminating HCV infection by 2030 since it is aligned with global health objectives.⁽²⁾

The widespread and alarming prevalence of both hepatitis B and C in Pakistan is fueled by a multiplicity of interlinked factors, which include but are not limited to the insufficient availability of healthcare centers, a widespread lack of knowledge of the transmission modes of these viruses, as well as a deficiency in such preventive measures as would otherwise checkmate their spread.⁽³⁾ The highly endemic prevalence of hepatitis C virus genotype 3 across the entire nation presents significant challenges to the eradication efforts currently being made, which in turn necessitates the development of treatment measures that are specifically tailored to take into account the myriad regional variations that exist in Pakistan. Despite the many efforts that are currently and continually being made, the extremely high infection rates continue to dominate, with compelling evidence and immediate need for a holistic countrywide survey that would provide better insights and information to support efforts aimed at checking the prevailing transmission of these viruses, as well as expanding the scope of the availability of treatments to infected individuals.^(2, 4)

The future direction of hepatitis control in Pakistan depends on effective enforcement of enhanced surveillance systems, public enlightenment programs, and equitable access to antiviral therapy across all provinces. In the absence of concerted efforts to overcome such regional challenges, prospects of reducing the burden of hepatitis B and C are dim, compromising the health status of many people in the country. With the epidemiology of such infections evolving, continuous surveillance and modification of interventions will be critical in controlling the existing epidemic and achieving the desired public health benefits.

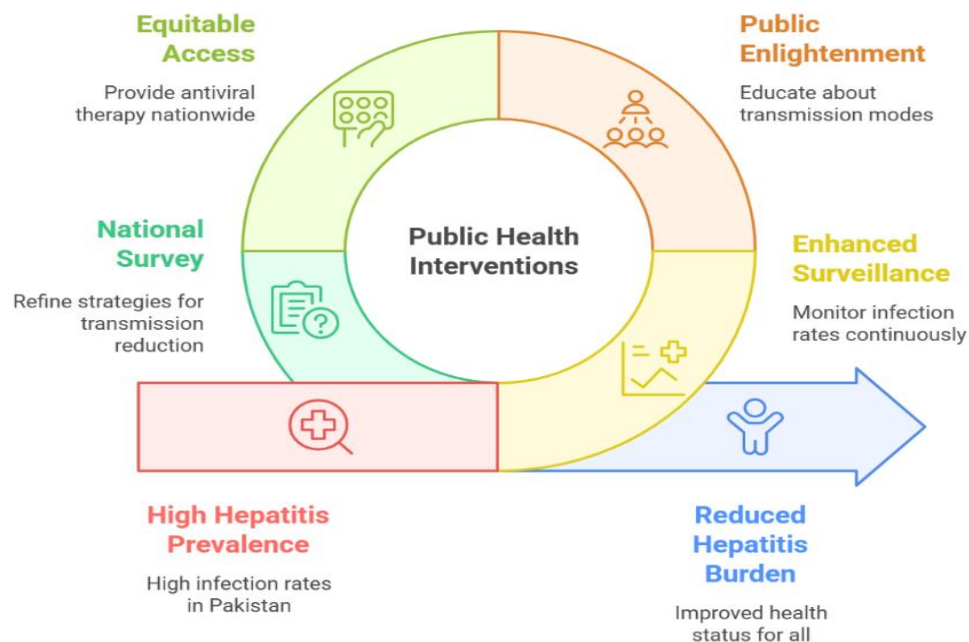


Figure 1: Reducing Hepatitis B and Hepatitis C in Pakistan

2. OVERVIEW OF HEPATITIS B AND C

Hepatitis B and C are two viral infections that impose a heavy burden on public health in Pakistan with high prevalence levels presenting substantial challenges to health systems. HBV and HCV infections are endemic in Pakistan with extensive overlap in modes of transmission. The epidemiology of hepatitis C in Pakistan as unveiled by 1 is uniform across provinces, suggesting that social, economic, and access to care determinants are to blame for high infection rates. Notably, HCV is a persistent public health issue with no sign of decreasing prevalence over the past three decades. The high burden is strikingly high among particular groups such as PWID and those with underlying liver disease,

suggesting the necessity for enhanced public health interventions.(5)

Genotyping research suggests genotype 3 of HCV is prevalent across Pakistan, highlighting the homogeneity of the viral strain that makes treatment protocols challenging. Such homogeneity across provinces suggests that although local public health issues arise, underlying epidemiological factors contribute uniformly to sustaining high prevalence rates. This implies a critical need for a national survey to gauge the current status of HBV and HCV infections. Such an exercise would underpin the formulation of focused interventions targeting the specific needs of high-risk groups as well as the general population.(6)

Table 1: Prevalence Rates of HBV & HCV in Pakistan by Region(1)

Region/Province	HBV Prevalence	HCV Prevalence
Sindh	~2.5 %	~6.1 %
Punjab	~2.4 %	~8.9 %
Khyber Pakhtunkhwa (KPK)	~4.3 % (blood donors)	~6.1 %
Baluchistan	~4.3 %	~5.8 %
National Average (All Pakistan)	~1.1 % (HBsAg)	~7.5 % (anti-HCV)

3. EPIDEMIOLOGY OF HEPATITIS B IN PAKISTAN

Hepatitis B Virus (HBV) depicts a heterogeneous and geographically variable epidemiological pattern in Pakistan. The overall population has a prevalence rate between 2% and 5%, but specific risk groups like intravenous drug users, sex workers, and those exposed to blood transfusions have infection rates exceeding 10%. These differences are modulated by differences in accessibility to health care, economic status, and cultural practices involving reuse of needles. Interestingly, Sindh and Baluchistan have higher infection rates than Punjab and Khyber Pakhtunkhwa, which reflects variation in medical infrastructure and public awareness regarding disease spread. Genotypic characterization shows that genotype D is the most prevalent among HBV infections across the country, making treatment plans and vaccine design challenging.(7) The same trend exists with Hepatitis C infections, where genotype 3 is most prevalent and indicates overlapping risk factors and the need for focused public health measures. One of the major hurdles to the control of HBV transmission is that there are no organized screening programs, and also there is stigma related to hepatitis, which acts as a deterrent for individuals to undergo diagnosis and treatment. Consequently, many infected individuals remain undiagnosed and untreated, and this leads to a high risk of chronic disease progression and transmission. The need for a country-level survey that will revise epidemiological information provides an opportunity to tailor public health programs to the needs of the population and significantly improve approaches towards prevention of hepatitis, especially aiming for elimination of both HBV and HCV infection by 2030. Holistic approaches in the shape of education programs, increased access to health care, and culturally tailored intervention programs are thus needed in the control of Hepatitis B in the multicultural population composition of Pakistan.(8)

3.1 Current prevalence rate

Hepatitis B is a significant public health situation in Pakistan, and prevalence here varies from 1.1% to 1.6% among the general population. The burden of the disease is uneven across the country—provinces such as Baluchistan and Khyber Pakhtunkhwa are more impacted, mainly due to poor vaccination coverage and unsafe injections. Urban areas with better medical facilities have lesser prevalence rates. Even though there is an effective vaccine, ongoing determinants like poor public awareness, incomplete immunization, and reuse of contaminated medical equipment drive the rate of transmission higher. All these problems have to be tackled through intensified immunization drives, regular screening, and campaigns to prevent the spread of Hepatitis B throughout the country.(9).

3.2 Demographic Variation:

Hepatitis B prevalence in Pakistan is extremely disparate by demographic group and is affected by a range of factors that span geography to socioeconomic status, age, gender, and beyond. Consequently, the infection is notably found to be more prevalent within rural and underserved provinces like Baluchistan, Khyber Pakhtunkhwa, and the interior of Sindh. These areas are vulnerable to weak healthcare infrastructures, low immunization levels, and immense prevalence of unsafe medical practice that facilitates transmission of the virus. Urban areas, however, are found to have lower rates of infection; however, they are also exposed to a whole lot of risk, especially in the informal healthcare facilities where regulation is poor.(10)

Moreover, it has been found that men are disproportionately affected, and this could be due to higher occupational exposure and higher levels of exposure to unregulated providers of health services in the healthcare industry. Adults aged between 20 and 40 years make up a majority of the reported cases, and this is largely attributed to their higher mobility and higher level of exposure to a range of risk factors, including injections and undergoing surgery. More specifically, children in low-resource settings continue to remain at a high

risk of Hepatitis B due to poor coverage of birth-dose vaccination and lack of effective interventions against mother-to-child transmission of the virus.⁽¹¹⁾

Added to these health hazards are sweeping socioeconomic differences that further complicate the problem, as these differences restrict access to required healthcare services and

information regarding the disease. In an effort to combat this complex public health problem effectively, it is essential to enact region-specific interventions that are responsive to the complexities of the problem and work towards curbing the transmission of Hepatitis B across Pakistan.

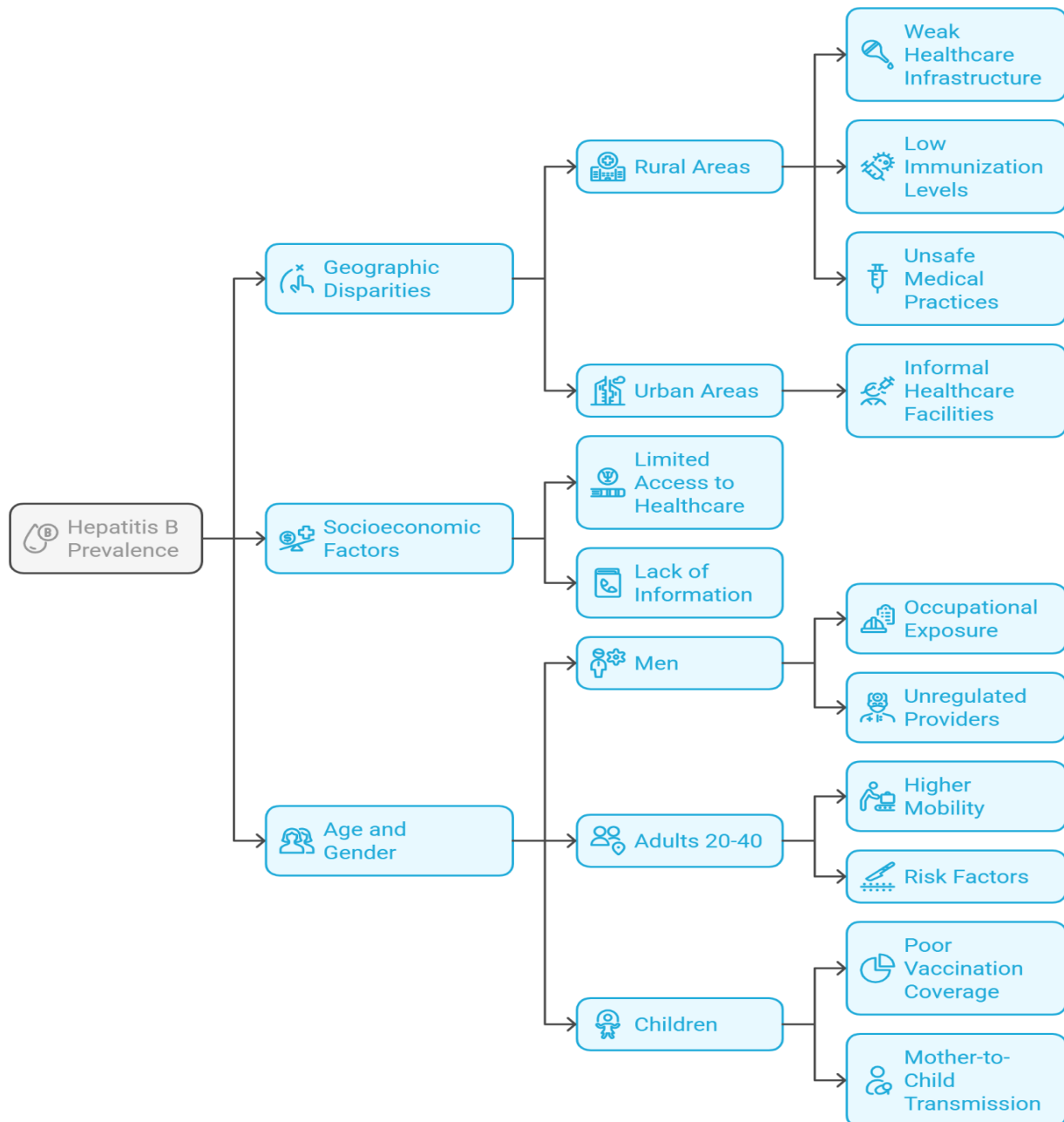


Figure 2: Hepatitis B prevalence and risk factor in Pakistan

3.3 Geographical Distribution

Hepatitis B in Pakistan shows huge variations from province to province, reflecting huge discrepancies in its rate of prevalence. The highest rate of prevalence is seen in the provinces of Baluchistan and Khyber Pakhtunkhwa, where in most instances the rate of incidence crosses an alarming rate of 4%. Such a critical state can be attributed primarily to a mix of factors such as poor healthcare infrastructure that is unable to meet the demands of the population, poor vaccination rates exposing many, and unsafe medical procedures such as injecting reused needles and unregulated blood transfusions that further increase the spread of the disease.⁽¹²⁾ Punjab also shows a moderate rate between 2.2% and 3.4%, where city centers generally have better awareness of Hepatitis B and better access to vaccination compared to their rural counterparts. Federal territories such as Islamabad also show lower rates of prevalence, which is attributed primarily to the presence of better healthcare systems and ongoing preventive measures. Such observed differences reflect the extreme importance of adopting targeted public health interventions that are specifically designed to meet the unique challenges of each province, in order to effectively contain and ultimately eradicate the incidence of Hepatitis B from Pakistan.⁽¹³⁾

4. EPIDEMIOLOGY OF HEPATITIS C IN PAKISTAN

The Pakistani epidemiology of Hepatitis C Virus (HCV) is that of a high and stable rate of prevalence which is strikingly consistent across the different provinces. Studies have shown that the prevalence of HCV within the nation is a whopping 4.7%, and variation between regions has ranged from 0.4% to 33.7% ². Prevalence of HCV is highly concerning in light of neighboring nations, where infection rates are lower. Certain groups, including those who inject drugs (PWID) and those with chronic liver disease, have significantly higher rates, which attests to the need for interventions among these high-risk groups ¹.⁽¹⁴⁾

In the past three decades, evidence has shown that these high rates of infection have been relatively constant, with no sign of a subsequent decline. The most prevalent genotype of the virus has been Genotype 3 of the virus, and there has been minimal variation in the pattern of distribution from province to province. Additionally, the issues brought about by HCV in Pakistan are further complicated by the lack of national, comprehensive, and up-to-date surveys, which could provide a clearer picture of the epidemic. Therefore, there is a pressing need for greater efforts in public health education as well as in an intensification of treatment programs towards the World Health Organization's 2030 target for the elimination of HCV.⁽¹⁵⁾

4.1 Current Prevalence Rate

Prevalence rates of Hepatitis B and C in Pakistan have been said to show remarkable regional homogeneity, with significant public health implications. A study by Mahmud, Al Kanaani, and Abu-Raddad ¹ states that both Hepatitis C virus (HCV) and Hepatitis B virus (HBV) are chronic conditions in all the provinces of the country. More specifically, HCV prevalence rates have been said to be extremely high and show no apparent decline over the last three decades. The evidence lends itself to the homogeneity of the epidemic, and the most commonly reported genotype has been genotype 3, which was prevalent in all the provinces. This suggests that despite the alarming rates, causative factors for the infections may be the same, and hence intervention strategies could be applied uniformly in all regions.⁽¹⁶⁾

Also emerging from the observations are particularly alarming levels of HCV among injecting drug users (PWID) and other high-risk clinical groups, which are the most urgent priority areas for targeted public health action. The unresolved challenges in HCV, particularly the inability to record significant decline in prevalence and the sustained high prevalence among at-risk groups, expose the limits of current healthcare responses. Unless prompt introduction of policies that expand the scale of HCV treatment and accelerate effective

prevention takes place, realization of the World Health Organization's vision of HCV infection elimination by 2030 is precarious. Hence, concerted national action must be initiated to rescale access to treatment and introduce systematic prevention components to cover the most vulnerable groups.(17 .

4.2. Demographic variation:

Hepatitis C is a significant public health problem in Pakistan with infection rates that foretell dismal trends in epidemiology. Studies have established that almost 6.8% of Pakistan's population has been infected, with geographic differences noted in the country. Certain areas like Punjab and Sindh have noted infection rates as high as 6.7% and 5%, respectively. The need to act on factors maintaining hepatitis C infection, particularly in vulnerable populations, is indicated by such numbers.(6

Demographic features explain a major proportion of infection prevalence. Research has confirmed

that young adults, especially aged between 21-25 years, are more vulnerable, with married men having a far higher prevalence compared to unmarried men. This is an indication of how much cultural and environmental circumstances contribute to the spread of hepatitis C, reflecting lifestyles and risk-taking behavior among different demographic profiles.(18

In contrast, Pakistan's statistics are worse, given that most developing nations have the same or even greater prevalence rates due to poor medical procedures and poor screening. With these issues at hand, it is clear that the epidemiology of hepatitis C deserves targeted public health interventions in consideration of not only medical treatment but also the socioeconomic and cultural determinants of the disease transmission. Considering these in mind, there will be a better approach towards the development of effective prevention and control in the future. (19

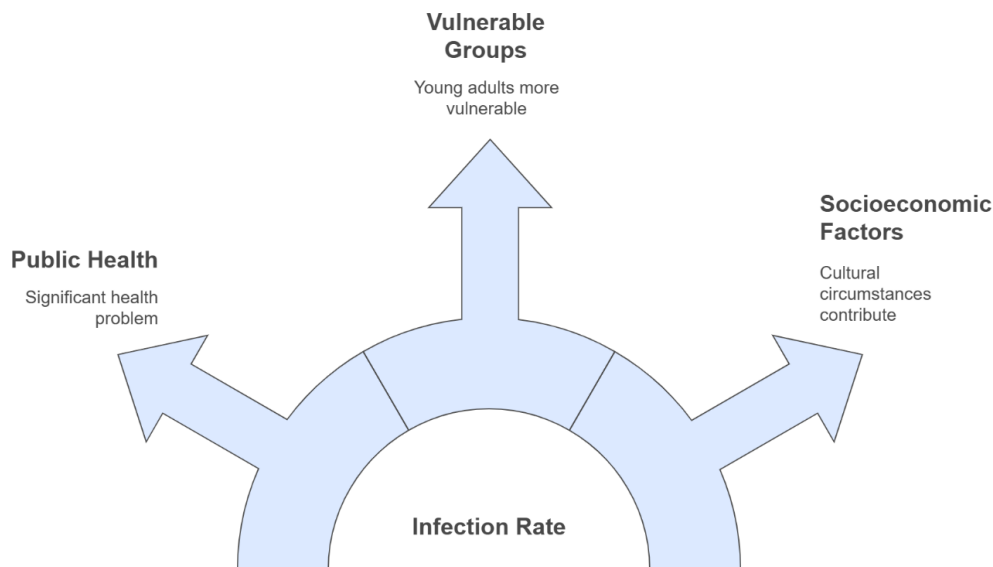


Figure 3: Hepatitis C Infection Impact Pakistan's Population

4.3 Geographical Distribution:

Hepatitis C remains a significant public health problem in Pakistan with variable prevalence all over the country. The prevalence of the infection is estimated at almost 6.8% of the population, with much higher levels in provinces like Punjab

and Sindh with an infection rate of 6.7% and 5%, respectively. Regional variation is based on several demographic factors such as age and marital status, as it has been proven through studies that the young married men are disproportionately infected. Virus transmission is

mainly due to unsafe injection practice and the use of non-sterilized medical instruments, which still prevail in most parts of the country.(20

In comparison to such an environment, the rates of prevalence in Pakistan are extremely high in relation to the world average, where it's estimated that 1% of the population carry the infection. This stark contrast is symptomatic of the necessity for targeted public health interventions in Pakistan. While the epidemic still rages, it is vital to understand the demography and geography that enable the spread of Hepatitis C. That knowledge can be used for designing effective prevention programs. Furthermore, tackling the socioeconomic determinants that drive the spread of Hepatitis C is equally important. Poverty, poor healthcare access, and ignorance of safe practices are chief drivers in combating the virus. (21

5. COMPARATIVE ANALYSIS OF HEPATITIS B AND C

5.1 Co-infection Rate

The rates of co-infection of Hepatitis B (HBV) and Hepatitis C (HCV) among groups, particularly among HIV-positive groups, are key determinants of public health problems. Empirical findings suggest that the rate of co-infection prevalence varies among groups, normally as a function of gender, age, and comorbid disease. For instance, studies conducted in Ethiopia have established that men have a greater prevalence rate of co-infection of HBV compared to women, possibly as a result of biological factors like disparity in antibody response and viral load.(22

The public health implications of all these co-infections are impressive as they can complicate treatment regimens and worsen disease outcomes. Such patients are usually predisposed to increased liver disease and compromised efficacy of hepatitis and HIV therapies. Co-infection is also responsible for decreased recovery rates among patients with tuberculosis, and this points to the interconnectedness of these viral infections.(23

An examination of the rates of co-infection is critical in a bid to create effective treatment and

improve patient care. Awareness of the interaction between infections is of importance, especially in resource-constrained settings where the health system is under strain. As co-infection rates increase and impact treatment, the need for targeted clinical interventions is even more important, thus paving the way for the next discussion on clinical effects of such complex interactions. (24

5.2 Clinical Outcome

The clinical presentations of Hepatitis B (HBV) and Hepatitis C (HCV) infections show striking differences, which profoundly affect patient health in the long term. HBV becomes a chronic infection that has the potential to develop into liver cirrhosis or hepatocellular carcinoma, particularly in co-infected individuals with HCV or HIV. The interaction between these viral infections could accelerate hepatic decompensation, thus make therapeutic managements and approach more challenging. Chronic HCV, on the other hand, tends to show more favorable efficacy with newer antiviral therapies, which allow the majority of patients to achieve a sustained virologic response (SVR). However, if untreated, HCV is also able to cause such severe hepatic complications similar to those caused by chronic HBV.(25

5.3 Treatment Responses

Treatment results for Hepatitis B (HBV) and Hepatitis C (HCV) also vary extensively because of their different biological characteristics and the efficacy of treatment available. In Hepatitis B, antiviral drugs like lamivudine, tenofovir, or entecavir are commonly employed to inhibit viral replication and reduce inflammation in the liver. Treatment results, however, are uncertain in the case of patients of chronic infection. Though these medications have the ability to reduce the viral load, total elimination of the virus is uncommon, and follow-up and even combination therapy at times are required to stimulate the immune system.(26

For Hepatitis C, the introduction of direct-acting antivirals (DAAs) has changed treatment protocols. The medications, e.g., simeprevir-

sofosbuvir combinations, have been highly effective, with sustained viral response in most cases. Co-infected individuals, who must deal with both HBV and HCV, are difficult to treat. Treatment is difficult here since a co-infecting virus interferes with the effectiveness of the other's treatment.(27)

The efficacy of combination therapies aimed at controlling both infections is the focus of ongoing studies. A drug-to-drug interaction pathway can lead to better clinical outcomes through better knowledge of the interaction between treatments and their impact on each

other. Patient responses to treatments in HBV and HCV, ultimately, are key to enhancing overall health and better treating liver disease. Findings in research highlight the importance of individualized treatment regimens that consider both viral loads and patient response to create more effective management strategies. Additionally, the application of antiviral therapy like lamivudine in chronic HBV infection demonstrates the complex relationship between viral suppression and immune damage reversal, to the realization of the necessity of targeted therapy.(28)

Table 2: Comparative Analysis of HBV & HCV in Pakistan(29)

Aspect	Hepatitis B (HBV)	Hepatitis C (HCV)
General Population Prevalence	HBsAg declined from 2.6% in 2007 to 1.1% in 2019 (Sindh)	Anti-HCV rose from 5.1% (2007 to 6.2% (2019 (Sindh
Blood Donor Prevalence	1.25% (2018, rising to 1.66% (2022	1.46% (2018, rising to 2.22% (2022
Provincial Prevalence	~1.1% national average (HBsAg	6.1% in Sindh, 8.9% in Punjab (2018-19 serosurveys
Paired Population Study	1.08% HBV (Gujranwala blood donors 2010-15	2.78% HCV (same group, 2010-15
Risk Group (Thalassemia Patients)	4.13% pooled HBV prevalence	29.8% pooled HCV prevalence

6. SOCIOECONOMIC FACTORS INFLUENCING PREVALENCE

The homogeneity of Hepatitis B and C prevalence rates at the regional level in Pakistan has significant public health implications for interventions. Mahmud, Al Kanaani, and Abu-Raddad 1 determine, through research, that the HCV and HBV present chronic risks across all provinces of the country. HCV prevalence rates are specifically found to be extremely high with no visible decline over the past three decades. The data position the epidemic as homogeneous with the genotype 3 being the most commonly reported, found widespread across the different provinces. Homogeneity of the epidemic grants that even though rates are alarming, the causes leading to the infections may be the same, meaning probable intervention measures may be effective across all regions.(30)

7. CULTURAL PRACTICES AND THEIR IMPACT

Cultural practices are dynamic and subject to evolution in response to the forces of modern society. Globalization, where there is an open sharing of experiences and knowledge between nations, has dramatically influenced local cultures. The interaction has prompted syncretism as well as the creation of new cultural forms. Although the integration of global and local factors might cause some of the old customs to be lost, it also gives people a space to reinvent and redefine their cultural identity. For instance, ancient festivals can now be infused with contemporary art forms or digital media, and so become more appealing to young generations. These transformations prove that culture is a dynamic entity that grows and changes yet remains anchored to its roots.(31)

8. GOVERNMENT POLICIES AND INTERVENTIONS

There are numerous types of government policies, including economic, social, and environmental policies, each one of which is meant to address specific needs of society. Fiscal policies, including taxation and spending, are formed by economic policies, and social policies are meant to enhance the quality of life through health, education, and welfare programs. Environmental policies address issues related to sustainability and natural resource preservation, showing growing concern for environmental issues in government.(32)

The importance of such policies cannot be overstated, as they have an impact on the day-to-day lives of citizens and society. Properly drafted government policies make governance easier, improve public services, and foster accountability in institutions. But problems usually arise when such policies are being executed, that is, in balancing conflicting interests and addressing newly arising issues.(32)

In this context, economic interventions are increasingly important. These forces are used as instruments to direct economic growth and distribute resources adequately, satisfying the

people's needs and considering overall environmental sustainability. When one thinks of economic interventions, it is important to value their connection to government policies and their intention of securing a more equitable future.

8.1 Economic Interventions

Economic interventions are useful tools that governments utilize to influence economic conditions and solve problems that impact the population. Economic interventions are varied and consist of fiscal policy, monetary policy, and trade policy. Fiscal policy involves the decision on government spending and taxation, with the aim of spurring economic activity or containing inflationary pressures. For instance, during economic recession, governments may boost investment in infrastructure projects to create employment and boost demand. Conversely, monetary policy is controlled by central banks and entails regulation of the supply of money and interest rates. Central banks seek to ensure price stability and economic growth by adjusting these instruments. For instance, a reduction in interest rates can stimulate borrowing and investment, thereby enabling an economy to emerge from recession.(33)



Figure 3: Cycle of Economic Intervention

8.2 Social Policies and Welfare Programs

Social welfare policies and schemes are the cornerstones of government strategies for enhancing the quality of living of citizens. Welfare schemes are designed to address various social issues, such as poverty, health, and education, to provide all citizens with access to basic services. Healthcare policies, for instance, are designed to provide medical care to all, with a focus on preventive treatment as well as curative treatment. Universal healthcare systems attempt to remove financial barriers so that people can avail themselves of needed medical care without worrying about high expenses.(34)

9. TRENDS IN HEPATITIS B AND C MANAGEMENT

The progress in Hepatitis C treatment has been remarkable, particularly with the introduction of direct-acting antivirals (DAAs). DAAs have significantly enhanced cure rates and reduced treatment periods from previous interventions, allowing more patients to attain sustained viral clearance. Despite such progress, access barriers remain, particularly among marginalized groups like PWID. Scaling up DAAs from specialized sites to community health centers would improve coverage and motivate more persons to start therapy. Furthermore, rigorous application of patient-centered education and support interventions is imperative. Aside from informing patients on adherence, these interventions enhance treatment success owing to an improvement in adherence.(35)

10. FUTURE DIRECTIONS IN HEPATITIS RESEARCH AND POLICY

In the years to come, additional research and policy response to hepatitis must focus on the strengthening of global health programs and the expedited development of effective vaccines. The creation of a Hepatitis C vaccine is particularly promising in potentially revolutionizing global prevention and control programs. Several candidates are already under clinical trials, with the aim of inducing long-term immunity against the virus. A successful vaccine would reduce transmission rates by a significant factor and be a

significant contributor to eradication efforts, especially in areas with poor access to treatment.(36)

Against this backdrop, actual success in the control and prevention of hepatitis depends on the encouragement of enhanced vaccine studies, the improvement of cross-border cooperation, and the creation of quality policy and law. These are the key priorities that can lead to successful control and eventually the elimination of Hepatitis B and C, which can cascade to improved health for the world.

CONCLUSION

The epidemiology of Hepatitis B (HBV) and Hepatitis C (HCV) in Pakistan is characterized by similarities at regional levels, primarily attributed to differences in the health infrastructure, economic status, cultural belief, and the intensity of public health intervention. High rates of infection in Sindh and Punjab provinces are always attributed to unsafe medical practice, such as reuse of syringes and untested blood transfusion. Underdeveloped and rural areas are characterized by low population awareness and low coverage of vaccines. Inadequate screening functions, vaccine resistance, and low access to treatment are other obstacles to national control of viral hepatitis. In an attempt to effectively restrain transmission of HBV and HCV, a multidisciplinary policy involving mobilization of public awareness campaigns, strengthened health policy enforcement, and increased immunization drives specific to regional conditions is urgently demanded. Strengthening of disease surveillance and inter-provincial coordination will be key in bridging gaps and enhancing access to prevention and treatment interventions across the nation.

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