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Review Article

National viral hepatitis control program in India: current status and SWOT analysis

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ABSTRACT

Viral hepatitis is a public health problem in India. The National Viral Hepatitis Control Program (NVHCP) launched in 2018 paved a way in India's journey towards universal health coverage but gaps remain in diagnostics, peripheral capacity, vaccine supply, and pediatric treatment access. This review maps the history of the program in India, its current status, gaps, and opportunities toward the 2030 elimination goals. For the purpose of this review, a comprehensive search of literature was conducted examining technical and operational guidelines, management protocols, policy documents, and review articles to understand India's journey towards viral hepatitis control. The program demonstrates multiple strengths including strong government commitment, comprehensive national guidelines, free diagnosis and treatment services, robust preventive strategies, and trained master trainers. However, several weaknesses exist as well like insufficient diagnostic infrastructure, limited molecular testing capacity, inadequate trained manpower at peripheral centers, erratic hepatitis B vaccine supply, vertical transmission prevention gaps, and no free treatment provision for children. The opportunities outlined include newer WHO guidelines extending treatment to children and adolescents, point-of-care diagnostic facilities, public-private partnerships, one-stop centers, dried blood spot testing, treat-all approaches, and establishing an adult immunization program. Major threats foreseen are competing national health programs diverting resources, dropout from diagnosis-treatment cascade, public and healthcare worker stigma, and limited private practitioner participation in the program. Although NVHCP has a robust framework aligned with global strategies, addressing gaps in awareness, logistics, and peripheral-level manpower through equity-focused innovation is essential to achieve 2030 elimination targets and advance universal health coverage.

Keywords: NVHCP, S.W.O.T analysis, Current status

INTRODUCTION

Viral hepatitis represents a significant global health burden, with approximately 3 million infections and 1.1 million deaths annually worldwide.[1] As per the WHO 2024 Global Hepatitis Report, the disease is the second leading infectious cause of death globally, with 1.3 million deaths per year, the same as tuberculosis. Data received from 187 countries have shown that the estimated deaths from viral hepatitis has increased from 1.1 million in 2019 to 1.3 million in 2022; hepatitis B being the cause of 83% and 17% that of hepatitis C along with a global estimate of around 3500 people dying everyday due these infections.[2] In India, viral hepatitis continues to be a major public health concern, with an

estimated 40 million people affected by hepatitis B virus and 12–18 million by hepatitis C virus.[3]

The Sustainable Development Goals and the World Health Organization's Global Health Sector Strategy on viral hepatitis have set ambitious targets for the elimination of viral hepatitis as a public health threat by 2030, aiming for a 90% reduction in incidence and a 65% reduction in mortality.[4] World Hepatitis Day is observed on 28th of July each year, for the purpose of raising awareness to combat hepatitis and to achieve the goals for the elimination of viral hepatitis as a global health threat. The 2025 theme, 'Let's Break it Down', therefore calls for a collective action in order to break down the remaining barriers to prevention, care and the cure of hepatitis.[5] The Government of India is also committed to achieve these targets within the country.

Therefore, this review provides a timely and critical analysis of the National Viral Hepatitis Control Program in India, evaluating its operational strengths, inherent weaknesses, emergent opportunities, and potential threats in achieving these ambitious elimination targets.

METHODS

We conducted a systematic search on databases like Science Direct, Scopus, Medline, PubMed, Web of Science, Google Scholar, and various open access journals. A detailed review of existing literature was done including technical and operational guidelines, management protocols, policy documents and various review articles in order to have a comprehensive understanding of the current landscape of viral hepatitis control in India.

Study design and setting

A narrative review of selected articles and published technical guidelines from across regions of India has been prepared.

Study period

Articles published from 2018 to 2026 on the National Viral Hepatitis Control Program, newer treatment guidelines and reviews about the newer guidelines were considered for the narrative review.

Study selection / Information source

We conducted a thorough search in key databases of scientific articles using Web of Science, Scopus, Medline, PubMed, Science Direct, Cochrane Library, Embase, Google Scholar, and selected only open access literature.

Literature search strategy

With the help of MeSH terms, Boolean operators, and appropriate keywords, suitable articles were identified for the review. The MeSH terms included : 'Viral Hepatitis' AND 'India' AND 'Control' OR 'Surveillance' OR 'Current Status' OR 'Progress'.

Inclusion criteria of studies

We only included those articles that mentioned the progress of the National Viral Hepatitis Control Program in India, challenges of implementation, the current status of the program and review papers on the newer recommendations with regards to viral hepatitis .

Exclusion criteria of studies

Clinical trials were excluded from our study.

Data collection tools and technique

The relevant articles were thoroughly reviewed; the titles and abstracts of the articles were identified and selected as per the inclusion and exclusion criteria. The full-text was collected wherever possible. Current status of program implementation and its S.W.O.T analysis have been presented in the form of a narrative.

Table 1: List of studies reviewed for S.W.O.T analysis (Published global recommendations and government reports not included).

S.No.	Year of publication	Author	Key messages	Recommendations/Remarks
1.	2025	Gupta et al	Identifies limitations and gaps in the functioning of the program along with suggestions to fill these gaps	Importance of enhancing education and awareness on viral hepatitis along with community participation
2.	2025	Anirvan et al	History of World Hepatitis Day and importance of dedicated days	Importance of sustained commitment, innovation and equity-focused strategies.
3.	2025	Lakshmanan et al	Importance of point-of-care (POC) viral diagnostic tools in the detection and management of vaccine preventable viral infections like hepatitis B	Emphasis on the optimization of point of care testing in order to focus on increasing affordability, ease of use, and regulatory compliance
4.	2024	Rajkumar et	Incorporating same day "test and treat"	Incorporation of the model for

Continued.

S.No.	Year of publication	Author	Key messages	Recommendations/Remarks
		al	for hepatitis C virus to close gaps between diagnosis and treatment	community-led viral hepatitis care in vulnerable groups
5.	2024	Jarasvaraparn et al	Review on the updated clinical treatment guidelines for children with hepatitis C infection. The new direct-acting antiviral agents are very effective in curing the infection in children without major serious side effects. However, there are limited reports on children with high-risk conditions, including cirrhosis, cancer, and HIV/HBV coinfection	In order to eliminate hepatitis C infection in childhood itself, Universal prenatal screening is key for the identification of perinatally exposed newborns. Moreover, there is a need to enhance research in high-risk conditions
6.	2023	Singla et al	The state of Punjab has a higher prevalence of Hepatitis C virus than the rest of the country. Therefore, the Government of Punjab launched the Mukh Mantri Punjab Hepatitis C Relief Fund (MMPHCRF), one of the first states in India to provide free antiviral treatment and subsidized diagnostic services for HCV at public sector facilities	Improving accessibility by decentralizing services to the lowest levels of care (Community Health Centres and Primary Health Centres) and piloting telemedicine as a service delivery model
7.	2023	Pandey et al	Emphasis on the need for an update on the National Viral Hepatitis Control Program by incorporating global evidence-based advancements—such as point-of-care testing, self-testing, and expanded eligibility criteria	To broaden its operational guidelines to actively detect and link high-risk populations to the cascade of care
8.	2023	Jindal et al	Noted the need to shift from the 'treat select' to 'treat all' strategy for viral hepatitis as it would include a larger population at risk for developing hepatocellular carcinoma, thereby helping us meet the 2030 elimination goals	To note the financial challenges of introducing a 'treat all' policy
9.	2022	Markby et al	They found that by delivering hepatitis C healthcare services at a single site resulted in better retention to the treatment cascade rather than when patients were referred to higher centres for viral load testing and treatment	With a focus on retention of patients to the treatment cascade, they emphasised the need for a 'one-stop-shop' model where all of the patients' healthcare needs will be met with regards to hepatitis C
10.	2020	Parija et al	Emphasised on the importance of incorporating the World Health Organisation (WHO) recommendations administering the birth dose of hepatitis B vaccine up to 7 days after birth, in order to increase the coverage of the birth dose of the vaccine in the country	To update the national guidelines on the vaccination schedule in the National Immunisation Schedule (NIS) and to train all healthcare workers about the change for effective implementation and coverage enhancement
11.	2019	Khan et al	With the data of 199,899 children aged 12–59 months from the National Family Health Survey-4 (NFHS-4), 2015–16, they examined the district level spatial distribution and clustering of hepatitis B vaccination among children. They found that there was spatial clustering of hepatitis B vaccination with the mother's education, full antenatal care checkups, post-natal utilization, institutional births and birth registration at the district level.	In order to bridge the gap between access to vaccination in the vulnerable groups, the existing healthcare programs like Janani Suraksha Yojana can be utilized in order to increase the coverage of the birth dose of hepatitis B vaccine along with other routine immunization doses

RESULTS

Brief history of the viral hepatitis control efforts in India

The historical perspective dates back to 1965 at the National Institute of Health with Dr. Baruch Samuel Blumberg, an American physician who was awarded the 1976 Nobel Prize in Physiology or Medicine, for his work on Hepatitis B virus. Originally the virus was called "Australian Antigen" because it was named after an Australian aborigine's blood sample that reacted with the serum of an American hemophilia patient.[6] This subsequently led to the development of diagnostic tests and the Hepatitis B vaccine.[7] Hepatitis C was identified in 1989, after being incorrectly classified as "non-A, non-B" hepatitis earlier. The 2020 Nobel prize for this discovery was jointly given to Harvey J. Alter, Michael Houghton, and Charles M. Rice.[8]

In the 1990s, the situation regarding viral hepatitis, globally, as well as in India, was quite dismal. During this period, vaccination for Hepatitis B in India was costly, and there was virtually no awareness regarding the disease and its prevention.

Dr. Blumberg served as a professor at the Indian Institute of Science at Bangalore from January to April 1986, and in March 1987 he sent a report to the then Prime Minister Rajiv Gandhi titled, 'Comments on Prevention of Hepatitis B infection in India'. This was a significant step towards the development of the national program in India, as it was acknowledged by the government. His efforts were campaigned by Professor Shivaram Prasad Singh and his foundation which led to the celebration of the first 'Hepatitis B Eradication Day' in India on 28th July 2001 in Cuttack, Odisha. Unfortunately, the event was not state funded and was covered out of pocket by the foundation.[7]

Subsequently in 2002, the Hepatitis B Project was initiated in India with support from the Global Fund for Vaccines and Immunization. There were also voluntary programs launched in other parts of the country to promote vaccination. The following year, on the same date a 'Hepatitis B Eradication Mission' was established in the state of Odisha. In 2005, both the Indian National Association for Study of Liver (INASL) as well as the Indian Society for Gastroenterology (ISG) supported the idea of observing World Hepatitis B Eradication Day on the 28th of every July.

Shortly thereafter, the World Hepatitis Alliance, which had been celebrating the day on 19th of May, invited Dr Singh to speak at the World Health Assembly on the topic 'Hepatitis B Atlas - a comparative compilation of data on prevalence, burden, risk factors, management strategies and vaccination programmes related to hepatitis B across the world', in Geneva in 2008. Finally, in 2010, the World Health Assembly passed the resolution that 28th of July shall be celebrated as the World Hepatitis Day, marking a united global day for the efforts towards viral hepatitis.[7]

Eventually, India launched the National Viral Hepatitis Control Program in 2018, with the aim of eliminating hepatitis C by 2030, to achieve reduction in population of people infected by Hepatitis B and the long-term complications like cirrhosis and hepatocellular carcinoma associated with both the viruses, along with reducing the risk, morbidity and mortality due to Hepatitis A and E.[9]

Current status of functioning of the National Viral Hepatitis Control Program in India

The National Viral Hepatitis Control Program (NVHCP) in India is currently in its expansion phase, the program has utilised the resources from existing health programs including manpower, diagnostic facilities, and infrastructure. The services are being delivered through treatment sites located within an existing healthcare facility. The referral centres are termed as 'Model Treatment Centres' (MTCs) which are situated at the tertiary level hospitals, which are to also act as referral units for management of complicated cases, if needed.[10]

Formally launched in 2018, the goal of the program is to eliminate hepatitis C by 2030 and to reduce the morbidity and / or mortality due to hepatitis B as per the Sustainable Development goals 3.3. In alignment with the goals, around 978 treatment sites have been strengthened across 711 districts of India. Since the program was first launched, about 10.3 crore individuals have been screened for both Hepatitis B & C as of March 2024. The program has also integrated with existing national health programs, including the National Program for Surveillance of Viral Hepatitis (NPSVH), National AIDS Control Program (NACO), and National Tuberculosis Elimination Program (NTEP).[10]

S.W.O.T analysis of the program

The subsequent sections highlight the identified strengths, weaknesses, opportunities, and threats of the National Viral Hepatitis Program in India, offering a structured framework for understanding the program's current state and future trajectory.

Strengths

Government's commitment

The initiation of the National Viral Hepatitis Control Program in India on World Hepatitis Day 2018 represents the government's commitment and a stride towards a nation-wide approach to viral hepatitis prevention and treatment.9 The program's alignment with the World Health Organization's Global Health Sector Strategy on viral hepatitis underscores its commitment to eliminating viral hepatitis as a public health threat by 2030.[4]

Availability of National guidelines

The Operational Guidelines for National Viral Hepatitis Control Program along with the Laboratory Guidelines for Viral Hepatitis Testing, and the National Guidelines for Diagnosis and Management of Viral Hepatitis were released.[11] This would ensure nationwide uniformity in the diagnostic and treatment protocols to be followed and set the stage for rolling out the program.

Comprehensive framework

The program's comprehensive framework addresses the epidemiological diversity of viral hepatitis in India, including the more prevalent forms like Hepatitis A and E as well.[9]

Free of cost care

The diagnosis and treatment of viral hepatitis is an expensive proposition limiting its utilization by the general population. By providing these services free of cost through the program the government envisages to make the services affordable thereby increasing its uptake by a greater number of affected individuals. The National Viral Hepatitis Control Program has also launched free diagnostic and treatment facilities for hepatitis C, aligning with the World Health Organization's management guidelines.[9] The Mukhya Mantri Punjab Hepatitis C Relief Fund, initiated in 2016, exemplifies a state-level initiative demonstrating the feasibility of providing free antiviral treatment for Hepatitis C, setting a precedent for other states of the country.[12]

Robust preventive strategies

One of the objectives of the program is to enhance community awareness on hepatitis and lay stress on preventive measures among the general population, especially in high-risk groups. Key strategies towards prevention are already in place like immunization with Hepatitis B vaccination, blood and blood products safety, safe injection practices, and safe drinking water and hygiene facilities and working in close synergy with the program. Screening of all pregnant women for HBsAg as well as anti-HCV is now mandatory during pregnancy which further strengthens the program.[9]

Developing linkages

Efforts to establish linkages with the existing national health programs and to the surveillance system for awareness and prevention and operations research commitment by the Department of Health Research are an inherent component of the program.

Trained manpower

Training sessions at the national level were held to train experts across the country in the diagnosis and management of viral hepatitis as per standardized protocols by the technical resource group on laboratory and care support and treatment. Around 250 master trainers have been trained so far in order to initiate the nation-wide cascading of training to the state and district levels.[9]

Weaknesses

Lack of diagnostic infrastructure

Insufficient diagnostic infrastructure and public awareness is currently being viewed as a major limitation impeding early detection and linkage to adequate healthcare.

Molecular testing is only available at specific sites, thereby delaying diagnosis and initiation of treatment. Moreover, patients have to travel from one institute to another for a variety of laboratory investigations.[13] Also, there are no universal or community screening services available. Only a patient presenting to a health facility may avail these services.

Voluntary screening for HCV during pregnancy

The routine universal screening for HCV in pregnancy is not a mandatory investigation yet, only being piloted in a few of the states.

Lack of trained manpower

Despite training of trainers at the national level, there is still a lack of adequately trained specialists at the peripheral centres.[14]

Erratic supply of Hepatitis B vaccine

Hepatitis B vaccination, although a part of the NVHCP, the supply of the vaccine is erratic thereby hampering access of high-risk groups like healthcare workers / family members of affected individuals to the vaccine.[15]

Another weakness is in the prevention of vertical transmission of Hepatitis B, although a birth dose of the vaccine is a part of the Universal Immunization Program in India, children born in hard-to-reach areas often miss the birth dose due to delay in reaching the health care facility.[16]

No provision for free treatment for children

Although treatment of the patients is provided free of costs under the program, it only includes adult patients of Hepatitis B or C.

Lack of trained non-specialist healthcare workers may limit the drug dispensing and follow up care required at the primary and grassroot levels of healthcare.

Opportunity

Newer treatment guidelines for children

The new guidelines by WHO on the treatment of Hepatitis C virus infection has been expanded to include children above the age of 3 years.[17,18]

Additionally, WHO has also updated the treatment recommendations of Hepatitis B infection for adolescents above the age of 12 years. Similarly in the new WHO guidelines for Hepatitis B, the eligibility criteria for anti-viral prophylaxis have been expanded for pregnant women to prevent mother-to child transmission of the infection.[19]

Newer guidelines for screening

The Centre for Disease Surveillance has advised screening for HCV in all pregnant women, except in areas where the incidence is < 0.1%.[18] Every person aged 18 years and above should be screened for hepatitis B and C, with periodic repeat testing for those found reactive, accompanied at every step by risk-reduction counselling, keeping in mind strict maintenance of patient confidentiality, and providing anonymous risk-disclosure mechanisms where feasible.[18] Incorporating these guidelines in the NVHCP in India offers an opportunity to increase the scope of the program for providing standardized diagnosis and treatment to more beneficiary groups.

Point of care diagnostic facilities

Incorporate point-of-care molecular testing at the peripheral health facilities in order to reduce patient travel time and prevent delayed diagnosis and initiation of treatment. This includes the use of point of care HBV DNA nucleic acid test assays (NAT) instead of lab-based HBV DNA testing to assess the eligibility for treatment and also for monitoring treatment response.[19]

Similarly for HCV, guidelines by the WHO have emphasized decentralization of healthcare services through point-of-care molecular testing for HCV such as HCV RNA viral load testing. This should be coupled with simplified service delivery by expansion of HCV testing and treatment services at the lower-facility levels, integrating care with existing services such as in primary care to facilitate patient compliance to testing and treatment.[20]

Public-private partnership

Partnership with private laboratories would help bridge the gap for advanced diagnostics by making the services available to a larger population. Public-Private Partnership models have worked well for other national health programs as far as provision of diagnostic facilities are concerned.

Provision of one stop centers

To provide a single site (eg., one-stop-centre at District level) for patients thereby reducing delay in diagnosis and initiation of treatment, as shown in the study conducted by Ekta et al in Delhi in which decentralization of the healthcare services relating to Hepatitis C infection resulted in a higher yield of seropositive cases and adherence to treatment.[21]

Use of dried blood spot for testing

As per global recommendations, the use of Dried Blood Spot (DBS) for serological testing instead of whole blood samples may prove to be beneficial in areas with low manpower facilities or non- availability of Rapid Diagnostic Tests (RDTs) or in hard-to-reach areas where access to a laboratory for viral assay may not be available.[20]

Treat-all approach

Present guidelines recommend treatment for non-cirrhotic HBV infected individuals based on the level of ALT elevation, high HBV DNA, or significant liver fibrosis. Unfortunately, asymptomatic patients with HBsAg seropositivity remain untreated, and therefore remain at the risk of developing advanced liver disease, and also may contribute to the horizontal transmission of infection. Enough evidence is available to support the 'treat all' approach. An increase in the number of Centres of Excellence / Model Treatment Centres for treatment of complicated cases of viral hepatitis would be required at the regional level to provide tertiary level care across the expanse of the country. Likewise, an increase in the number of Treatment Care Centres for uncomplicated cases at the district level would be warranted. Consolidation of smaller projects and state programs into the national program would offer an opportunity for uniformity in service delivery and harmonization. Also, emphasizing the importance of decentralization of the treatment implementation from the specialists to the general practitioners in order to reduce the pool of the sources of infection.[22]

Adult immunization program

Having a program for adult immunization including Hepatitis B vaccination akin to the Universal Immunization Program for children would obviate the fragmented and erratic approach to Hepatitis B vaccination existing at present.

Threats

Competing interest

There are several national health programs which are nearing their elimination targets for diseases like TB, Measles, Malaria and the increasing burden of NCDs and

ageing population. These may act like an impediment for the program on viral hepatitis by competing with program budget and manpower requirements.

Leak from diagnostic and treatment cascade

The largest dropout from NVHCP is anticipated between serological screening and confirmatory molecular tests followed by initiation of treatment and its adherence due to regional differentials in the availability of services and the direct and indirect costs involved in the provision of care.

Associated stigma

The stigma and lack of awareness among the public as well as the healthcare workers about viral hepatitis, its various manifestations, routes of transmission and complications act as a deterrent for the uptake of screening and treatment adherence. Limited participation of the private practitioners poses a huge challenge for the program.

Table 2: Key strengths, weaknesses, opportunities and threats of the National Viral Hepatitis Control Program in India.

Strengths	**Weaknesses**
1. Government's commitment	1. Lack of diagnostic infrastructure
2. Availability of National guidelines	2. Voluntary screening for HCV during pregnancy
3. Comprehensive framework	3. Lack of trained manpower in peripheries
4. Free of cost care	4. Erratic supply of Hepatitis B Vaccine
5. Robust preventive strategies	5. No provision for free treatment for children
6. Developing linkages	
7. Trained manpower at national level	
Opportunities	**Threats**
1. Newer treatment guidelines for children	1. Competing interests
2. Newer guidelines for screening	2. Leak from diagnostic and treatment cascade
3. Point of care diagnostic facilities	3. Associated stigma
4. Public-Private Partnerships	4. Limited participation of the private practitioners
5. Use of Dried Blood Spot for testing	
6. Treat-All approach	
7. Adult Immunization Program	

DISCUSSION

Viral hepatitis is a global health burden.[1] This review set out to lay a comprehensive understanding of the history of the viral hepatitis program in India, its current status and the gaps in implementation. In the light of this analysis, it is clear that the foundations for reaching the 2030 elimination goals are in place, however there are still major operational and implementation gaps; thereby warranting enhanced efforts in order to sustain the progress towards the sustainable development goals of 2030.[4]

The major strengths identified were the presence of comprehensive national operational and laboratory guidelines, free diagnostics and treatment, and the integration of the program into existing national health programs, thereby maximizing efficiency. In contrast, the weaknesses were majorly focused on service delivery, human resource shortages, and infrastructure inadequacies. Therefore, this asymmetry seen between national policy and its delivery emphasizes the need for sustained efforts towards progress.

The program is in line with the Global Health Sector Strategies, the programme's strengths are governance, financing and free medical services.[4] The decision to provide diagnosis and treatment free of cost was an important step towards universal health care, as the historical barrier to hepatitis care in India was the out-of-pocket expenditure associated with availing healthcare.[9] The Mukh Mantri Punjab Hepatitis C Relief Fund demonstrated at the sub-national scale that a publicly financed, decentralised treatment model could achieve cure rates comparable to those reported from tertiary care and specialist settings.[12] The incorporation of hepatitis A and E within the programme's framework further strengthens the NVHCP, and is epidemiologically apt for a country in which transmission of faeco-oral hepatitis continues to be a major cause of morbidity and mortality. Moreover, building on pre-existing infrastructure and services and integrating along with other national health programs is a key strategy for building a sustainable healthcare system.[9]

The weaknesses identified in this analysis were systemic problems: the program's diagnostic and therapeutic capacity is concentrated at higher levels of care, while the population burden is distributed across the various levels

of healthcare service delivery. Unavailability of nucleic acid testing at the first point of contact obligates patients to undertake repeated journeys for serological screening, confirmatory viral load testing, baseline evaluation and on-treatment monitoring; which therefore leads to loss of patient from the treatment cascade. The absence of any community or universal screening mechanism makes case detection passive and confined to those who present to a health facility; hence the asymptomatic chronic carriers who constitute the reservoir of transmission actually remain out of the treatment cascade and continue to spread the disease.

The human resource gap is another major weakness. The initial training of about 250 master trainers at national level was an appropriate step, however cascade training to district and sub-district levels has been slow and uneven, so the program still remains dependent on specialists where task-shifted delivery would have been more appropriate.[14]

The remaining weaknesses like the exclusion of paediatric patients from free treatment, the erratic supply of hepatitis B vaccine to high-risk adults including healthcare workers and household contacts, and missed birth doses in hard to reach and home delivered populations also needs to be addressed individually because each leaves a defined group outside the reach of the universal program.[16]

The opportunities identified require policy adoption rather than new infrastructure. The expansion of treatment eligibility to children above three years for hepatitis C and to adolescents above twelve years for hepatitis B, together with the broadened criteria for antiviral prophylaxis in pregnancy to prevent mother to child transmission, creates a clear and immediate case for extending free treatment provision under NVHCP to paediatric and adolescent age groups. Given that perinatal and early childhood infection is the major cause behind development of chronic hepatitis B, closing this gap has implications beyond the actual numbers treated.[17,18]

Moreover, decentralisation through point-of-care molecular testing is the intervention with the greatest potential to improve program performance. Point of care HBV DNA and HCV RNA platforms, combined with dried blood spot sampling for areas with limited laboratory access or cold chain, would break the need for multiple visits into a single encounter and directly address the anticipated leak in the treatment cascade. The delivery of these services through the Ayushman Arogya Mandirs, and the establishment of district-level one-stop centres, would help align hepatitis care with the broader comprehensive primary healthcare reforms already under way.[19,20]

Similarly, the case for a treat-all approach in chronic hepatitis B deserves programmatic consideration. Restricting treatment to those meeting viral load or other thresholds leaves a large asymptomatic HBsAg-positive individuals untreated and under long-term surveillance they are unlikely to sustain, and at continuing risk of progression and onward transmission.[22] A simplified eligibility algorithm would reduce the diagnostic workload, ease the specialist dependency described above, and improve retention. Finally, the absence of any structured adult immunisation platform in India means that hepatitis B vaccination of healthcare workers, household contacts, people who inject drugs and other high-risk groups remains opportunistic; a defined adult immunisation schedule would convert this from an ad hoc activity into an accountable programme component.

The most important threat is competition for financial and human resources with other health programs approaching elimination targets. Stigma and low awareness, among healthcare providers as well as the public, decreases both screening uptake and treatment adherence. The limited engagement of the private sector, which manages a substantial proportion of first health contacts in India, threatens both case detection and the completeness of program data. The National AIDS Control Program and the National Tuberculosis Elimination Program both faced the problems of stigma, cascade attrition and private sector non engagement, and both responded with mandatory notification, structured public private engagement, decentralised diagnosis, patient support mechanisms and dedicated counselling cadres.

Additionally, examples from various other countries, like mass screening and treatment campaigns undertaken in Egypt, and the elimination programs in Rwanda, showed that the population level impact in hepatitis C is achievable, but that it depends on active case finding and a mission or campaign mode approach rather than passive detection. The NVHCP has not yet adopted this approach.[23,24]

Taking all these points into consideration, it is clear that India is on track towards elimination of viral hepatitis, with a need to shift focus onto service delivery and treatment availability, and ensuring adherence to treatment in order to decrease rates of disease transmission in the community.

Limitations

This review is based on data from published literature, program documents and guidelines; therefore, it has limited field data or program monitoring and evaluation related information. Therefore, the information may vary according to states across India. Moreover, a SWOT analysis is a descriptive method of analysis of available data.

CONCLUSION

So far, we have presented an overview of the strengths, weaknesses, opportunities, and threats related to the

National Viral Hepatitis Control Program in India. It reveals a robust framework with political commitment and stride towards elimination of Hepatitis C by 2030 along with other objectives in line with the Sustainable Development Goals and the WHO's Global Health Strategies on viral hepatitis. However, as we have seen there are areas where gaps need to be plugged like suboptimal awareness, logistic issues, lack of adequately trained manpower at peripheral level and many more. Therefore, in order to reach the above-mentioned goals by 2030, a renewed focus on equity and innovation in order to propel the efforts of the program is needed to safeguard the health of millions in our country and advance India's commitment towards universal health coverage.

Recommendations

Given the limitations of this review, a primary implementation research of the viral hepatitis program and its cascade of care at the national, state and district level is required to better understand the gaps in its implementation.

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