







REVIEW ARTICLE

Peer support for people living with hepatitis B virus—A foundation for treatment expansion

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Abstract

Chronic hepatitis B infection (CHB) affects 300 million people worldwide and is being targeted by the United Nations 2030 Sustainable Development Goals (SDGs) and the World Health Organisation (WHO), working towards elimination of hepatitis B virus (HBV) as a public health threat. In this piece, we explore the evidence and potential impact of peer support to enhance and promote interventions for people living with CHB. Peer support workers (PSWs) are those with lived experience of an infection, condition or situation who work to provide support for others, aiming to improve education, prevention, treatment and other clinical interventions and to reduce the physical, psychological and social impacts of disease. Peer support has been shown to be a valuable tool for improving health outcomes for people living with human immunodeficiency virus (HIV) and hepatitis C virus (HCV), but to date has not been widely available for communities affected by HBV. HBV disproportionately affects vulnerable and marginalised populations, who could benefit from PSWs to help them

Abbreviations: CHB, chronic hepatitis B; CHW, community health worker; DOT, directly observed therapy; HBV, hepatitis B virus; HCC, hepatocellular carcinoma; HCV, hepatitis C virus; HCW, healthcare worker; HIV, Human Immunodeficiency virus; HRQL, health related quality of life; PSW, peer support worker; PWID, person who injects drugs; RCT, randomised Controlled Trial; RLS, resource limited setting; SDG, sustainable development goals; UK, United Kingdom; US, United States; WHO, World Health Organization.

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navigate complicated systems and provide advocacy, tackle stigma, improve education and representation, and optimise access to treatment and continuity of care. The scale up of peer support must provide structured and supportive career pathways for PSWs, account for social and cultural needs of different communities, adapt to differing healthcare systems and provide flexibility in approaches to care. Investment in peer support for people living with CHB could increase diagnosis, improve retention in care, and support design and roll out of interventions that can contribute to global elimination goals.

KEYWORDS

advocacy, hepatitis B infection, patient care, peer support, sustainable development goals

1 | INTRODUCTION

Peer support workers (PSWs) are people with lived experience of a particular health condition and may be from similar communities or backgrounds to those whom they represent, including people with shared identities based on their sexuality, gender, ethnicity or other characteristics.¹ In the context of chronic hepatitis B infection (CHB), PSWs are those who are willing to professionally use their experience of living with CHB to encourage others to engage with hepatitis services, to provide education, connections to networks and resources, counselling, and support with linkage to care and treatment adherence. PSWs are an integral member of the multi-disciplinary team, enrolled in a formal career development programme that provides training, supervision and financial remuneration.

Peer support has been recognised as bringing diverse benefits, including improvements in health outcomes, education, quality of life, reduction in anxiety and depressive symptoms, and enhanced engagement with care.² For people living with infectious diseases, peer support has emerged as a successful approach in the management of hepatitis C virus (HCV) and human immunodeficiency virus (HIV).^{3,4} An increasing literature also describes the importance of PSWs as part of an interdisciplinary approach for people living with cancer,⁵ neuropsychiatric conditions,⁶ and chronic disease such as diabetes,⁷ as well as supporting individuals with specific needs, for example initiating breastfeeding.⁸

There is minimal literature regarding the role of PSWs in the management of CHB, but some evidence is emerging in favour of peer support. A study in Australia recruited PSWs living with CHB from different migrant groups to provide radio education and community forums in relevant languages, leading to considerable improvement in knowledge about HBV transmission.⁹ Other studies have shown the value of peer-led HBV education programmes, particularly in the context of those living in prison or experiencing homelessness, enhancing knowledge, dispelling stigma and increasing vaccination uptake.⁹⁻¹¹

Here, we advocate for the urgent need for the collation of evidence and experience for peer support as an integral part of HBV care, and argue that developing strong peer support for people

living with CHB could increase rates of diagnosis, improve individual experiences, prevent transmission, guide and maintain linkage to care and mitigate negative quality of life implications of CHB. These roles are increasingly important as ambitious international targets have been set for the elimination of HBV infection as a public health threat by the year 2030, enshrined under Sustainable Development Goals (SDGs) and endorsed by the World Health Organisation (WHO). Accordingly, national and international bodies are reviewing screening programmes and treatment guidelines with the aims of enhancing diagnosis, simplifying the approach to risk-assessment, and offering treatment more widely. These changes are reflected in new WHO guidelines published in 2024, which present relaxed eligibility criteria for treatment.¹² Peer support may be a crucial intervention to implement these recommendations in practice, by identifying those who should be offered treatment, and providing consistent, equitable access to medication and clinical care.

2 | BARRIERS AND CHALLENGES IN PROVIDING CARE FOR PEOPLE LIVING WITH HBV

HBV infection has been neglected as a threat to individual wellbeing and to population health, with approaching 1 million deaths per year as a consequence of cirrhosis, liver failure and primary liver cancer (hepatocellular carcinoma, HCC).¹³ Worldwide, HBV prevalence is substantially higher in resource limited settings (RLS), particularly the WHO Africa and Western Pacific regions. In Africa, there are nearly 90,000 deaths annually due to CHB,¹⁴ while 74% of all global deaths from liver cancer occur in the Western Pacific to which HBV is a significant contributor.¹⁵ In higher income countries, health service provision for people living with HBV still needs dramatic improvement. HBV is frequently more concentrated in 'key populations' and marginalised groups including people experiencing socioeconomic deprivation or homelessness, people who inject drugs (PWID), commercial sex workers, and migrants, in whom there are multiple intersectional factors affecting healthcare access.¹⁶ Local knowledge and insights are required to develop effective services that meet the

specific needs of diverse populations, accounting for social and religious contexts, tailored to healthcare infrastructure and resources, and accommodating different levels of health literacy. PSWs who represent local communities can provide insights and understanding into the cultural backdrop of specific groups.

Healthcare systems are often complex, and worldwide there is a lack of consistent, well managed diagnostic services for HBV. Care after the initial diagnosis can be lacking, with experiences of stigma and limited information given by healthcare professionals causing significant emotional impact and negatively impacting ongoing engagement with care.¹⁷ This is partly as assessment of HBV and treatment decisions are delegated to specialist secondary/tertiary care, and healthcare workers (HCWs) may not feel fully confident in their ability to provide accurate information. Accessible, reliable and relevant education, advice and resources for those living with HBV are often lacking. As HBV clinics are often centred in larger hospitals, many people have to make long journeys for clinical review, incurring out of pocket expenses, but also leading to lost work days and difficulties with childcare and other domestic roles.¹⁸ While health systems need to reduce their complexity and make HBV care more accessible, PSWs can also enhance navigation through services, direct people to HBV testing centres, provide outreach into rural communities, decentralise HBV care and improve treatment access and ongoing follow-up (Table 1). PSWs may work alongside other community health workers (CHWs) who are typically people from the same community, but without necessarily having lived experience of a particular condition.

3 | IMPACT OF AN HBV DIAGNOSIS ON QUALITY OF LIFE

Health Related Quality of Life (HRQL) is an essential multi-dimensional construct involving physical, psychological and social functioning.²⁹ HBV diagnosis can be associated with significant stigma and discrimination.¹⁹ This is exacerbated by myths and misconceptions around mechanisms of HBV transmission, and through discriminatory policies in some countries restricting travel, employment and educational opportunities for those living with HBV.²¹ Knowledge among HCWs can also be limited and inaccurate.³⁰ Poor understanding correlates with discriminatory behaviour towards those living with CHB,³⁰ perpetuates stigma, and leads to CHB having a significant impact on a person's quality of life.

For individuals diagnosed with HBV, initial emotional responses may include shock, panic, distress, numbness, or denial.³¹ The diagnosis can lead to anxiety about transmitting the virus to loved ones, fear of complications, having a shortened life-span, and potentially losing time with family (especially children and partners).³² Longer term, depression, stress, anxiety and self-isolation have been described.³³ Regular clinic visits (if accessible) serve as an ongoing reminder of HBV and its risks, and may perpetuate negative emotions, while simultaneously creating a feeling of 'passivity' for those who are not offered antiviral treatment (which can lead to loss of

engagement with clinical care).³⁴ To further understand the impact of living with CHB on HRQL, and to develop approaches to mitigate negative outcomes, better evidence about the breadth and depth of the impact is essential.

A global voice from the hepatitis B community is beginning to develop. A grassroots advocacy movement has grown alongside the call for HBV elimination, with people sharing their lived experiences and finally being included within the broader elimination agenda.³⁵ The community is demanding ownership and involvement in plans that recognise diverse needs, respect a desire to access treatment, represent different communities, build advocacy, tackle stigma and discrimination, champion opportunities to participate in research, and be offered a seat at the policy table.³⁶ The hepatitis B scientific and clinical community is recognising the importance of representation, support and visibility of diverse people living with HBV infection.³⁶ There is a move towards use of first-person language, so the individual is not defined by the infection, which affirms shared humanity, and acknowledges the complex identity of a person beyond a clinical diagnosis.²⁸ With increased mobilisation of the affected community, more people with lived experience of CHB are available to provide support to others through testing, diagnosis or navigation of care pathways. PSWs could play a major role to help identify, measure, understand, and alleviate the fears, anxieties and self-isolation experienced by people living with CHB, and improve overall quality of life.

Evidence evaluating current practical and emotional support for those living with HBV is limited. People are most likely to disclose their HBV status to their spouse or partner, and stigma tends to be reduced for those living with their families.³⁷ The reaction of families to an HBV diagnosis can be very varied with impact on psychological and mental wellbeing. One study in Australia showed that whole families commonly sought testing after a single diagnosis.³⁸ Among Chinese Americans in the US, HBV was seen as a 'family matter' with affected people keen to educate their families, promote testing and protect the health of the family³⁹; in this context HBV can be normalised and decoupled from stigma.

4 | EVIDENCE SUPPORTING THE SUCCESS OF PEER SUPPORT PROGRAMMES

The majority of data investigating the impact of peer support on the lives of people living with chronic blood-borne virus infections currently comes from the HCV and HIV fields, with most evidence coming from services for PWID. A study of >30,000 individuals in the UK showed that support from people with lived experience of HCV led to substantial care improvements, including more people initiating treatment (RR 1.12, 95% credible interval 1.02–1.21), completing treatment (OR 2.45, 95% credible interval 1.49–3.84), and accessing addiction services.³ Peer-led treatment initiation programmes, including decentralisation of facilities and provision of mobile clinic services have also been shown to be effective, including an 'HCV bus' in Norway²⁵ and peer 'tele-HCV'

TABLE 1 Summary of barriers in accessing consistent clinical care for people living with chronic HBV infection, and roles of peer support in tackling and overcoming challenges.

Barrier to care	Specific challenges	Role and impact of PSW
Stigma	Misappropriation of blame, shame or guilt Fear of discrimination and disclosure especially among couples and family members Myths and misconceptions about HBV transmission ^{19,20}	Provision of accurate information and education about HBV Psychosocial support, seeking and accessing health services Sharing of peers' personal experiences Building a community and networks with positive role models
Discrimination	Discriminatory policies or lack of protective policies for people with CHB ²¹ Negative attitude among communities, families, HCW ²² Negative impact on care-seeking, access and maintained linkage to health services Termination of employment or restricted opportunities; impacts on engagement with testing services ²³	Advocacy to tackle discrimination and raise awareness Support in sharing HBV status, for example with partners and families Advocacy for a workplace policy to protect those with CHB Advocacy for targeted delivery strategies for key populations can improve access and quality of life
Physical and geographical barriers	Diagnosis and treatment is often provided through secondary/tertiary care services in urban centres with poor access for rural populations ²⁴	Support with reach to remote/rural communities allowing decentralisation of care ²⁵ Work in parallel with CHW to help navigate local geography, systems and infrastructure
Out-of-pocket costs	Economic costs of travelling to clinics, missing work or domestic roles as a result of clinical visits, paying for blood tests and medications. ^{14,26} Loss of employment	Advice and support to access practical or economic support to reduce the financial burden of infection Advocacy for access to free testing, surveillance and treatment
Language and cultural barriers	Beliefs that HBV is related to witchcraft Incorrect perceptions that infection can be transmitted through day-to-day cultural practices like sharing food Ambiguous terms or lack of local language to name or explain the infection ²⁷	Provision of information, advice and support that are language and culture-specific Education and information directed at HCW and the wider community as well as people living with CHB
Poor awareness and education	Little access to accurate information and educational materials; Poor HCW knowledge Persistence of unanswered questions among people living with HBV ²²	Access to bespoke information, education and advice that is accessible, tailored to the needs of the individual Improving community and HCW awareness
Lack of person-first language	Terminology used to describe people living with HBV can be pejorative, discriminatory and enhance stigma ²⁸	PSWs can provide a safe environment in which each individual is supported and valued
Poor representation of people living with HBV	People living with HBV may have no role models or shared narratives; there are no examples of high profile individuals living with HBV	PSWs provide real-world examples of living with HBV infection, with personal stories and narratives that can be shared to provide support and develop a sense of community

Abbreviations: CHB, chronic hepatitis B; CHW, community health worker; HBV, hepatitis B virus; HCW, healthcare worker; PSW, peer support worker.

management for rural US communities.⁴⁰ The 'HepCare' project, funded by the European Union Health Service Executive and rolled out across four European sites to integrate HCV diagnostics and treatment, identified the need for flexible treatment options and provision of additional, tailored support to retain people in the cascade of care.⁴¹ The 'HepCare Plus' project followed this, which widely added a PSW to the care model, leading to 98% of those initiating HCV treatment going on to complete the treatment course.⁴² Peer-supported engagement/delivery has also led to high HCV treatment uptake (majority single-visit) among people with recent injecting drug use.⁴³ In Kenya, HCV treatment with Directly

Observed Therapy (DOT) with peer support was an effective approach among PWID.⁴⁴ A randomised controlled trial (RCT) based in outreach services for those experiencing problematic drug use or homelessness in the UK, showed providing a peer advocate increased the likelihood of successful engagement with healthcare by 18%⁴⁵ and the odds of a successful outcome were 2.5 times higher than in the group without a peer advocate.

Most evidence for the success of similar models in RLS comes from HIV. Here, community health workers tend to be from the same population group as those people being targeted by interventions; they are trusted by local people, and associated with

favourable outcomes.⁴⁶ A systematic review and meta-analysis identified 20 RCTs looking at the effectiveness of peer support for people living with HIV, seven of which were from Africa.⁴⁷ These studies included multiple motivational interviews, counselling and education. Studies were very heterogeneous and many outcomes could not be pooled, however the results generally favoured peer support. Another global meta-analysis drew on studies across several continents including eight trials conducted in RLS assessing the effect of PSW addition to standard HIV care.⁴⁸ Overall, a modest increase in treatment adherence was observed with introduction of PSWs, however this may be because in many HIV programmes, PSWs were already part of the standard of care so there was no significant change in practice. This illustrates how PSWs are now heavily integrated into HIV programmes globally and is something to strive for in the HBV field.

Whilst previous experience around PSWs from HIV and HCV can be adapted for those living with HBV, there are significant differences that should be acknowledged. Firstly, many HCWs have limited knowledge of HBV and information given to those living with CHB is often minimal or inaccurate.¹⁹ There has been far greater investment in education and training for healthcare staff around HIV and HCV, along with many more multilingual resources available. Developing PSW networks for HBV will therefore require more initial investment, as education is needed both for current healthcare staff providing diagnostics, treatment and counselling, and those living with HBV before peer support can be established.

Numerous peer-based non-governmental organisations have been established and resourced worldwide for HIV, providing the framework for individual peer support and wider community and policy maker engagement. This provides the infrastructure for those with lived experience to inform policy and programme development and implementation, allowing far more extensive engagement than solely supporting individuals with accessing treatment services. Some organisations are beginning to give those with HBV a platform, and online peer support is emerging (including access through platforms such as Facebook, WeChat groups, hepbcommunity.org⁴⁹⁻⁵¹), but such provision exists mainly without formal resourcing and is unable to facilitate reorientation of health service delivery to those living with CHB. Expansion of these platforms, including provision of robust financial and operational backing is essential to enable the scale up of accessible and sustainable HBV peer support provision worldwide.

5 | ADVANTAGES AND CHALLENGES FOR PROGRAMMES PROVIDING PEER SUPPORT

Roles and responsibilities for PSWs include providing advice and education, establishing rapport and facilitating patient-provider discussions.⁵² This can overlap with tasks performed by 'peer navigators' who are more typically focused on delivering practical support for care pathways (for example locating service users and

escorting them to clinical appointments). The HepCare project provided sustainable career development pathways to those delivering peer support, making them active members of the service provider team, developing skills in point of care diagnostics, liver fibrosis assessment and referral to primary and secondary care.⁴ Thus, peer networks can have a positive therapeutic impact on peers, through sharing their experience with others and providing opportunities for training and career development.⁴ Skills development and appropriate remuneration act as motivation for PSWs and support personal well-being. PSWs can also support other members of the healthcare team, with evidence that this can contribute positively to case-finding and management of HBV, easing pressures on stretched healthcare systems. PSWs can be empowered to lead on training others, participate in and lead research, and cascade information to the wider community.

At present, given that such a low proportion of all those living with CHB have been diagnosed (around 10% globally⁵³), and there are still significant challenges regarding stigmatisation, engaging people into PSW roles may be challenging. As access to diagnostics increases and public understanding of disease improves, this will change, but as roles are being developed, PSWs will likely need considerable support and education to help them develop skills for advocacy and healthcare navigation. This may include technical training, coaching and education about healthcare systems and community resources, requiring investment in community engagement strategies and distribution of accurate information around HBV. Peer support takes 'time and care to implement' and can cause tensions and challenges if not managed with clear expectations, and within an interdisciplinary framework.⁵⁴ PSWs and other members of the healthcare team need to be clear on each other's roles and PSWs must feel valued within the healthcare system to confer legitimacy and confidence within their roles in supporting others, along with freedom to suggest and implement change where necessary.

Risks to PSWs are dependent on the environment in which they are operating, the service they are delivering, and their access to collateral support from other peers and healthcare professionals. PSWs can be vulnerable depending on the nature of their client base and work location; in some settings, they have reported harassment, may have a risk of needlestick injury, and exposure to situations that could prompt drug relapse among those who themselves have a history of injecting drug use.⁵² Thus, it is crucial to undertake thorough training and risk assessment, prioritise safeguarding, provide psychologically safe environments, practical and emotional support, and ensure access to clinical advice, occupational health and mentorship.

The issue of costs for healthcare services must be considered. Employing a new group of care workers is costly and PSWs should be on a pay scale that allows training, progression and career development. We argue that these costs must be factored into any HBV elimination plan given the considerable evidence for their success from other chronic bloodborne viral infections, supported by forward planning by funders. The Global Fund has recently expanded its remit to include viral hepatitis, particularly vaccine

delivery programmes, access to diagnostics and treatment, initially through integration with HIV programmes. This opportunity should be grasped by countries to ensure development of PSWs for HBV is integrated into future applications for financial support, providing evidence (as set out here) as the rationale for such programmes. It is likely that costs can be recouped by improving clinical outcomes, with associated savings to the healthcare system in the long-term.

6 | OPERATIONAL IMPLEMENTATION OF HBV PEER SUPPORT

Building on successful strategies used for HIV and HCV, we can begin to suggest how HBV peer support could be practically implemented. Recently the UK's first formally paid and appointed PSW for HBV was employed in London, as an integral member of the multidisciplinary clinical service, and has already made an impact on patients attending the clinic.⁵⁵⁻⁵⁷ Successful programmes tend to consist of the common overall structures, including:

1. Provision of community education programmes to encourage testing and provide a platform to address concerns and demystify beliefs. Ideally these need to be led by a member of the community, who can be a PSW or may be a CHW who is not necessarily living with HBV but does understand the specific cultural context. Increasing numbers tested and education will give a larger group of people living with HBV from which natural peer supporters are more likely to emerge.
2. Access to information and education sessions for those living with HBV. These could initially be undertaken through existing services (e.g. as provided for HIV), and those currently known to be living with HBV could be invited together as a group. This gives the opportunity for education but also provides a peer group within which people can seek support and advice.
3. Investment in education of HCWs to ensure sufficient, accurate information is offered at the point of diagnosis and to reduce stigma from healthcare staff to encourage better patient engagement.
4. Provision of incentives for peer supporters, including adequate remuneration but also training, career development and emotional support, with structured employment as valued members of the healthcare team.
5. Decentralisation of services by moving HBV care out of central hospitals into the community. This encourages PSWs and navigators to come forward with a wish to empower their own community rather than working in a central hub. Community based clinics also enable interaction with those who find it difficult to access care, as shown in the HCV-bus in Norway,²⁵ and the tele-HCV programmes in the rural US.⁴⁰
6. Acknowledgement of the importance of peer support by funders, and ensuring those applying for funding include plans for development of peer support. This will highlight to funders that those

delivering HBV programmes think peer support work is important to deliver global elimination targets.

Although some of the challenges to implementation of PSWs are shared between settings, successful delivery models and implementation should be tailored depending on the local context and need to adapt according to available resources. CHWs already have a more established role in many RLS compared with high-income settings and are likely to be critical to delivery of progressively decentralised care.

CHWs are key personnel to target for HBV education and training to enable robust community education to be delivered and to ensure PSWs have expert help on hand without having to travel to central hubs. Remuneration of PSWs and provision of formal employment may be more challenging in RLS, but high-income settings also need to adapt to recognising these valuable roles and investing in funding. Therefore, initially other means to encourage development of a PSW network may be needed, such as combining peer support groups with trips to pick up HBV medicine, reimbursing for transport costs and/or provision of food/refreshments when people attend.

When advocating for the provision of routine peer support for people living with HBV, robust data are needed to show the impact and effectiveness of such interventions in different communities, and ideally to demonstrate cost-effectiveness. Approaches to data collection could include simple service evaluation exercises (e.g. quantifying the number of PSW consultations, questionnaire feedback from service users), or more formal research approaches using mixed methods and/or cluster randomised interventions to evaluate participation and retention in care for different groups (e.g. comparing minimal peer support with enhanced support, comparing peer navigator roles with peer support roles, evaluating health and well-being outcomes pre- and post-introduction of peer support, assessing the outcomes and impact of individual vs group peer support, or describing impact in different populations and settings according to resources, culture and systems of healthcare delivery).

Possible quantifiable outcomes include the number of follow up appointments attended, adherence to medication, viral suppression on treatment, and quality of life surveys. However, there are challenges in collecting and collating such evidence, especially when peer support is implemented as part of a bundle of service interventions, such that its individual impact cannot be easily disaggregated from other parallel initiatives to improve outcomes. Furthermore, health impacts of HBV infection evolve over years-decades, so endpoints for interventional studies can be difficult to determine. Importantly, data already exist for the impact of PSWs for HIV and HCV, so evidence for peer support in the HBV field should build on existing knowledge as much as possible, while also recognising different needs and challenges.

7 | FUTURE OPPORTUNITIES IN PEER SUPPORT

Although literature is emerging that documents diverse benefits of peer support, there are considerable opportunities for future

research and knowledge expansion, particularly in the case of CHB. These include:

1. Examining the benefits of peer supporters and peer navigators more widely using mixed methods approaches, ranging from direct clinical outcome improvements and consistent linkage to care, to quality-of-life enhancements such as reducing stigma, improving mental health and increasing confidence of sharing a diagnosis with friends and family.
2. Developing more peer support and peer navigator schemes for CHB infection to include diverse locations and population groups in different settings. This will become more feasible as treatment is expanded, and more people are engaged in care.
3. Including specific peer support development funding in CHB elimination plans and national guidelines. This will ensure the budget for peer support does not get side-lined and is ring fenced for this purpose.
4. Engaging those living with CHB in research development to ensure questions and approaches important to those living with HBV are at the forefront of any new research programme.
5. Undertaking cost-effectiveness analysis to provide evidence for ongoing resources for peer support.

A better grasp of the benefits of PSWs will improve the implementation of programmes in different contexts, enhancing flexibility for diverse international settings and in different communities. We should however be mindful that some communities may not be willing to participate in research due to traumatic experiences with institutions or governments in the past. Flexible, compassionate ways must be explored to engage more marginalised communities.

8 | CONCLUSION

Delivery of education, diagnostics and follow up for people living with HBV infection needs to be person-centric, flexible and operate beyond standard clinical structures to ensure interventions are accessible and acceptable to individuals and populations most at risk. Scaling up this access will be fundamental to delivering interventions recommended by new WHO guidelines published in 2024. We can use experience from HIV and HCV programmes to inform development of peer support for HBV. This includes provision of educational programmes to HCWs and into communities, decentralisation of services and providing incentives for those undertaking PSW. Input from those with lived experience of these conditions increases willingness to be tested, improves treatment adherence, reduces stigma and can enhance clinical outcomes. Current evidence advocating peer support for those living with HBV is limited, however the existing evidence justifies investment in PSWs as an essential part of the multidisciplinary team.

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Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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