

Hepatitis C and Mental Health: A Global and Indian Scenario

Dr. Moni Chaudhary^{1*}

ABSTRACT

Hepatitis C virus (HCV) infection is the leading cause of chronic liver disease which affects over 150 million individuals worldwide. Without treatment, one third of patients will develop cirrhosis and complications of end-stage liver disease. In India, the majority of chronic liver disease and related deaths are attributable to hepatitis C. People with HCV infection are likely to have poorer health related quality of life, physical, mental, psychosocial and neuropsychiatric problems. These problems are challenges for management of HCV infection. Mental health treatment is considered crucial in the overall management of HCV infection. A supportive environment and a nonjudgmental healthcare team are required for optimal medical and psychological management of patients with HCV. We present a comparison between mental health of patients with HCV infection in India and globally.

Keywords: *Hepatitis C, Mental Health and Management*

Hepatitis C virus (HCV) is a ribonucleic acid (RNA)-enveloped flavivirus, mainly transmitted by a parenteral route. It is the leading cause of chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC) the world over. HCV infection is a major public health matter of concern globally and especially for countries like India where health awareness is poor in general public (Puri, P. et al. 2014).

Of the 180 million people infected worldwide more than half are not even aware of their infection (Shepard, C.W. et al. 2005, and Denniston, M.M. et al 2012). After acute infection, 75%–85% of patients develop chronic disease (Afdhal, N.H. 2004). Chronic HCV infection often follows a progressive downhill course, and may ultimately result in cirrhosis, HCC, and the need for liver transplantation (Chen, S.L. and Morgan, T.R. 2006).

Hepatitis C in India

HCV has a huge disease burden in India (Puri, P. et al. 2014). The data on prevalence of HCV infection in India is scanty and the only sources are a few screening studies done on blood donors and pregnant women, and few community-based studies. In India, mandatory

¹ PhD, Department of Psychology (Meerut College, Meerut) Chaudhary Charan Singh University, Meerut, India
**Responding Author*

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screening for HCV started in 2000 (Mukhopadhyaya, A. , 2008). The seroprevalence of anti-HCV in blood donors in various places in India, since the year 2000, has ranged from 0.13 to 1.09% (Pandit, D.P., Pagaro, M.P. Nabamita, C., 2014). Sero positivity of HCV in antenatal women in India ranges from 0.19% to 1.6% (Mehta, K.D. et al. 2013 and Sood, A. et al. 2012). These data, however, cannot be extrapolated to the community as blood donors and pregnant women represent a selected and healthy population sample. In a community-based epidemiologic study, which was carried out in a district in West Bengal, of 3579 individuals screened, 0.87% were HCV antibody positive (Chowdhury, A. et al. 2003). As compared to West Bengal, in states of Punjab and Haryana the prevalence of HCV seems to be much higher. In a study done by Sood et al. 2012 prevalence rate of HCV infection in Mullanpur (district Ludhiana of Punjab) was found to be 5.2% of 5258 subjects screened door-to-door. This prevalence rate is possibly the highest in South Asia. Data from rest of the country are very limited. Data from western India revealed a seroprevalence of 0.78% (Arankalle, A. et al. 1992). Thus an estimated average prevalence of 0.8% (0.4%–1.0%) is reasonably suggested by a recent meta-analysis (Gower E. et al. 2014). While another systematic review suggests a prevalence of 1.0–1.9% (Sievert W. et al. 2011). Although the prevalence of HCV infection in Indian population is lower than that reported from industrialized countries of the west, the total reservoir of infection is significant. The WHO estimates that approximately 12 million Indians are suffering from HCV (while the prevalence in the US is just 2–4 million and in Europe is 5–10 million (WHO, 2014). This calls for urgent public health measures, including health education to limit the magnitude of the problem (Chowdhury A., et al. 2003).

In a community study from Haryana on 1630 cases of HCV (Verma R. et al. 2014). Only fatigue was the most common symptom present in 69% of patients, followed by abdominal pain in 47%. Symptoms like malaise and body ache were found among 14% of patients in this study (Verma R. et al. 2014). In community, till very late stage of disease, these non-specific symptoms are treated symptomatically, and blood tests are usually not carried out. Even if biochemical investigations are done, they are usually normal. In the community study from West Bengal, serum alanine amino transferase (ALT) levels were elevated in only 31% (8 of 26) of anti-HCV-positive subjects (Chowdhury A., et al. 2003). In spite of mild or no symptoms and normal or near normal biochemistry, these patients are infective, even though they do not know they are infected, and have a potential to spread the disease to others. These asymptomatic individuals comprise of a large reservoir of HCV carriers, who can act as a pool for its continuous transmission (Singh P. et al. 2014). HCV RNA is detectable in more than 80% of these cases suggesting actively replicative virus with potential of transmission (Chowdhury A., et al. 2003). In a previous study by Amarapurkar 2000, it was found that the majority of patients who develop chronic HCV infection are asymptomatic; but 60–80% develop chronic hepatitis as indicated by elevated ALT; around 30% maintain normal ALT. One-third of chronically infected patients develop progressive liver injury, fibrosis and cirrhosis over a period of 20–30 years, and 15% develop hepatocellular carcinoma (Amarapurkar D. 2000) As no protective vaccine is available and as the treatment is costly, lengthy, with a poor success rate, screening of healthy population remains the only means of

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primary prevention of HCV transmission (Pandit D.P. et al. 2014). Routine blood screening for Hepatitis C infection should be mandatorily carried out in all hospitals.

The only method to control the HCV pandemic is prevention of HCV transmission and early treatment of those infected. Over the last few years, numerous HCV vaccine approaches have been assessed in mice and primates, but only a few vaccines have progressed to human trials (Verma R. et al. 2014). Since, there is no hepatitis C vaccine available as yet, the only other preventive method is safe healthcare practices. Unsafe therapeutic injections and transfusion of unsafe blood are the predominant mode of transmission of HCV in India (Puri P. et al. 2014). Unsafe therapeutic injections include contaminated multi dose vials and saline bags from reinsertions of used needles and syringes, use of single needle or syringe to administer intravenous medication to multiple patients, and also due to the use of spring loaded finger stick devices without changing the platform to monitor blood sugar levels in multiples patients (Amarapurkar D., 2011 and . Prati D. 2006). Hence, to reduce the burden of HCV infection and to decrease the incidence of HCV infection, healthcare workers should play an important role (J. Hepatol. 2008).

Global Status of Hepatitis C

Globally, an estimated 130–170 million persons (2%–3% of the world's population) are living with hepatitis C virus (HCV) infection (WHO, 2004). This infection, particularly in its chronic form, is associated with sizable morbidity and mortality. More than 350 000 deaths are attributed to HCV infection each year, most of which are caused by liver cirrhosis and hepatocellular carcinoma (HCC) (Perz J.F., et al. 2006). An estimated 27% of cirrhosis and 25% of HCC can be attributed to hepatitis C worldwide, and disease rates can be even more substantial in countries with a high burden of infection. For example, in Japan, up to 90% of all reported cases of HCC are caused by HCV infection (Perz J.F., et al. 2006). Infection with HCV varies considerably by country and region. However, the true burden of disease is not well known in many countries, because capacity is limited for collecting epidemiologic data. In contrast, the mode of transmission is fairly well defined and most often involves exposure to contaminated needles or syringes, although the means by which this exposure occurs differs by country. Whereas HCV transmission in developing countries frequently results from exposure to infected blood and blood products in healthcare and community settings, HCV infections in most developed countries are associated with injection drug use (i.e, personal behavior typically of an illicit nature).

The global picture directly impacts the United States; tens of millions of foreign-born persons reside in the United States, many of whom are from countries where HCV infection is endemic (e.g, countries with an HCV prevalence $\geq 2\%$), and >1 million new immigrants enter the United States annually. Therefore, US healthcare providers who treat immigrants and foreign-born persons must recognize that decisions to screen these patients based on established risk factors for HCV infection in the United States (American Association for the Study of Liver Diseases 2012 and Centers for Disease Control and Prevention, 1998) may not be sufficient to identify at-risk individuals. Identifying persons with HCV infection has become even more critical with the recent availability of more effective therapies. Providers

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should maintain a high index of suspicion for occult or active HCV infection among their foreign-born patients. To diagnose and treat illness in their foreign-born patients and counsel patients about the potential infection risks of travel to countries where HCV infection is endemic, providers need to be informed about which countries have a high burden of HCV infection.

China has the highest estimated number of HCV-infected injection drug users (IDUs) in the world (Nelson P.K. et al.2011) and in Mexico, Pakistan, and Thailand, >80% of IDUs are anti-HCV positive (Nelson P.K. et al.2011). Still, in developing countries, the most common modes of transmission are healthcare associated (Alter MJ. 2007, Hauri AM et al. 2004 and Prati D. et al.2006)

Coinfection with Hepatitis C

Worldwide, up to 30% of the 33 million persons infected with HIV also are infected with HCV (Price, J.C. & Thio, C.L., 2010). The prevalence of HIV-HCV coinfection varies by region, with countries in sub-Saharan Africa having particularly high rates. In developed countries, HCV infection is becoming an increasing problem among HIV-infected men who have sex with men (Centers for Disease Control and Prevention, 2011). In a study of HIV-infected men who have sex with men in western Europe, incidence of HCV infection increased annually during 2002–2007 (Van der Helm et al.2011). Coinfection with HIV is associated with accelerated progression of liver disease and increased mortality among HCV-infected persons (Mohsen, A.H., et al. 2002 and Operskalski, E.A.& Kovacs, A. 2011) and some studies suggest that it may increase the risk of mother-to-child HCV transmission (Gibb ,D.M., et al. 2000). Early initiation of antiretroviral therapy among HIV-HCV–coinfected individuals is critical to health outcomes, because it may slow the progression of liver disease. However, HCV treatment is expensive and can be cost prohibitive in developing countries with large burdens of HIV-HCV coinfection, such as those in sub-Saharan Africa.

Mental Health and Hepatitis C

Mental health problems frequently occur in chronic infection with the hepatitis C virus (HCV) and during antiviral treatment.

In order of prevalence depression, fatigue, poor quality of life, social health, failure of coping and sleep disturbance are common in HCV Patients.

Depression is one of the most important complications during antiviral treatment of chronic hepatitis C infection. However, an increased prevalence of depression, fatigue, and cognitive disturbances has also been reported in untreated HCV-positive patients. Patients with psychiatric disorders or drug addiction also have an increased risk of HCV infection. (Schaefer M et al. (2012).

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Depressive symptoms are more influenced by psychological and social factors. Psychosocial support may therefore be beneficial to HCV patients. (Wilson, M.P. et al. 2010). Fatigue in HCV is of central type and is associated with cognitive impairment and depression. Psychological and psychiatric comorbidities as well as old age, being female and single have been important predictors of fatigue in several studies (Ashrafi, M. et al. 2012).

HCV infection is associated with poorer health-related quality of life, and physical, mental, and social health. A part of impaired health of these patients is related to cirrhosis, intravenous drug use, co morbid psychiatric disorders, stigmatization, poor social support, alcohol abuse, and interferon treatment. However, HCV itself is also associated with poorer health status particularly in the physical and cognitive domains, which might be related to brain alterations induced by the virus. Interferon treatment is an important cause of depression in HCV patients and sometimes is associated with irritability, manic episode, or acute confusional state. Social health of HCV patients is significantly impaired by stigmatization, poor social support, psychiatric comorbidities, and impaired coping, Modabbernia, A. et al. (2013).

Coping is the individual cognitive and behavioral response to perceived stress. In a study on over 100 individuals with HCV, the most commonly used coping style was problem-solving behavior followed by distraction and self-revalorization, religiousness and search for meaning, cognitive avoidance and dissimulation, and depressive coping. Importantly, recent diagnosis was associated with the highest levels of problem-solving behavior and the lowest levels of depression. Other factors such as mode of acquisition were found unlikely to affect the coping styles used (Kraus, M.R., et al. 2000). Several studies have reported using inappropriate coping strategies in patients with HCV which may negatively affect several aspects of their management (Grassi, L. et al. 2002 and Treloar, C. & Hopwood, M. 2008).

In a review, Sockalingam et al. (2010), addressed the sleep disturbances in HCV. Around 60% of patients with HCV may suffer from sleep disturbances due to various reasons including comorbid psychiatric disorders, substance abuse, and advanced liver disease. There is evidence for increased rate of sleep disruption, obstructive sleep apnea, and probably restless leg syndrome in patients with HCV.

Social Support

Social support is an important aspect of the lives of the HCV-infected individuals. In a study of 340 patients with HCV infection, 45% noted the loss of at least one relationship following diagnosis of infection (Blasiolo, J.A. et al. 2006). Studies have shown evidence of low social support in HCV-infected patients and its association with living alone, being unemployed, poorer HRQOL, exclusion from antiviral therapy, physical symptoms, psychiatric comorbidities, and IDU (Quarantini, L.C., et al. 2009, Blasiolo, J.A. et al. 2006, & Rowan, P.J. et al. 2005). Therefore, support groups may improve health outcomes in patients living with chronic HCV infection (Cormier, M. 2005).

Global Management

The World Health Organization (WHO) releases global estimates on the prevalence and burden of HCV infection (World Health Organization, 2004). In developed countries, where donated blood is routinely screened for HCV and measures are in place to facilitate infection control and safe-injection practices (Nelson, P.K. et al. 2011).

Many countries have yet to address primary prevention of HCV infection, particularly in the healthcare setting. However, even when control of HCV transmission is realized in these countries, HCV-associated morbidity and mortality from cirrhosis and HCC will continue to increase for years, even decades, in the absence of effective care and treatment programs. Linking prevention and control to testing, care, and treatment of HCV infection requires a comprehensive, cohesive approach tailored to meet the needs of individual countries. Public health officials must be familiar with the epidemiology of HCV infection within their borders and know whether widespread transmission is ongoing and in what settings it is occurring. Addressing transmission should be the first priority for any country.

Unlike global efforts to prevent and control HIV infection and other infectious diseases, those for HCV infection are limited and largely unaccompanied by community advocacy and awareness. This lack of grassroots support complicates efforts to ensure that populations most affected by hepatitis C, which typically are hard to reach and disenfranchised, receive needed services.

Also challenging is the absence of viral hepatitis control programs at the Ministry of Health level in many lower-to-middle income countries. This absence leads to fragmented and indirect efforts to prevent and control not only hepatitis C but all forms of viral hepatitis. As an example, efforts to address HCV transmission in healthcare settings may be performed by infection control programs, whereas efforts to test IDUs may be coordinated by a different Ministry of Health entity, such as the HIV program. This lack of coordination was first recognized in 2009, when the World Hepatitis Alliance surveyed its 193 member countries to determine the state of global viral hepatitis prevention and control (World Hepatitis Alliance, 2012). This WHO-funded survey revealed that although most countries have hepatitis C policies and goals in place, most existing programs are disconnected; 60% of these countries requested assistance from the WHO in establishing a more coordinated approach to prevention and control of HCV infection. In response, in 2010 the WHO passed World Health Assembly Resolution 63.18, calling for increased viral hepatitis education and improved testing and provision of care and treatment to the 500 million persons infected with hepatitis B virus and HCV worldwide (World Health Organization, 2012). The WHO has since formed a Global Hepatitis Program to assist member countries in achieving control of these diseases. Psychosocial impairment of HCV patients significantly impairs their treatment adherence therefore a supportive and nonjudgmental multidisciplinary team is required for optimal management of these patients.

CONCLUSION

Hepatitis C continues to cause substantial morbidity and mortality worldwide, and transmission continues unabated in many countries. Control of HCV infection requires a comprehensive approach that incorporates primary prevention of transmission through enhanced infection control and injection safety in healthcare settings and in the community, universal screening of blood and blood products, harm reduction programs, and increased public awareness about risk factors for HCV infection. For the 130–170 million persons already infected, newer, more effective therapies are available. However, lack of access to screening, care, and treatment limit the use of these therapies for most persons living with HCV infection globally, and deaths from preventable cirrhosis and liver cancer continue to increase. Governments need to address viral hepatitis comprehensively by improving surveillance, prevention, care, and treatment. In the United States, healthcare providers must be cognizant of the global burden and epidemiology of HCV infection and follow current screening care and treatment recommendations. In addition, they should consider screening foreign-born patients as appropriate, particularly those from countries where HCV infection is highly endemic, who may not have recognized risk factors for HCV infection.

In the substance users, HCV positivity was significantly and independently associated with several clinical, behavioural, and personality risk factors. Further research is needed to characterize risk behaviour, risk perception and risk networks with particular focus on HCV transmission in substance users in India (Basu, D. et al. 2015). It must be stressed however, that the reported distribution of the HCV can be expected to change with increasing migration of population and changes in high risk behavior and life-style. There is a need for public education about routes of transmission of viruses such as HCV. As tattooing and body piercing are still common practice in worldwide, it is important to educate and to create awareness in our population to prevent the acquisition of viruses such as HCV, especially in this era where we still await a suitable HCV vaccine (Christdac, J. et al. 2013).

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REFERENCES

- Afdhal N.H. *The natural history of hepatitis C. Semin Liver Dis.* 2004; 24 (suppl 2):3–8. [PubMed]
- Alter M.J. Healthcare should not be a vehicle for transmission of hepatitis C virus. *J Hepatol.* 2008 Jan;48:2–4. [PubMed].
- Alter MJ. Epidemiology of hepatitis C virus infection. *World J Gastroenterol* 2007; 13:2436–41.
- Amarapurkar D. How can we reduce the burden of Hepatitis C? *Saudi J Gastroenterol Off J Saudi Gastroenterol Assoc.* 2011 Aug;17:227–228. [PMC free article] [PubMed]

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- Amarapurkar D. Natural history of hepatitis C virus infection. *J Gastroenterol Hepatol*. 2000 May;15(suppl 1):E105–E110. [PubMed]
- American Association for the Study of Liver Diseases. *Hepatitis C guidelines pocket card, 2012*. Available at: <http://guidelinecentral.com/viewers/hepatitis-c-aasld.html>. Accessed 20 January 2012.
- Arankalle A., Chobe P., Banerjee K. Hepatitis C virus in Pune, India. *J Assoc Phys India*. 1992 Aug;40:562–563. [PubMed]
- Ashrafi M, Modabbernia A, Dalir M, Taslimi S, Karami M, Ostovaneh MR, et al. Predictors of mental and physical health in non-cirrhotic patients with viral hepatitis: A case control study. *J Psychosom Res*. 2012;73(3):218-24.
- Basu, D., Sharma, A.K., Gupta, S., Nebhinani, N. and Kumar, V. (2015). Hepatitis C virus (HCV) infection & risk factors for HCV positivity in injecting & non-injecting drug users attending a de-addiction centre in northern India. *Indian J Med Res*. Sep; 142(3): 311–316. doi: 10.4103/0971-5916.166596. PMID: PMC4669866
- Blasiola JA, Shinkunas L, Labrecque DR, Arnold RM, Zickmund SL. Mental and physical symptoms associated with lower social support for patients with hepatitis C. *World J Gastroenterol*. 2006;12(29):4665-72.
- Centers for Disease Control and Prevention. Recommendations for prevention and control of hepatitis C virus (HCV) infection and HCV-related chronic disease. *Morb Mortal Wkly Rep* 1998;47:1-39.
- Centers for Disease Control and Prevention. Sexual transmission of hepatitis C virus among HIV-infected men who have sex with men—New York City, 2005–2010. *MMWR* 2011;60:945-76.
- Chen S.L., Morgan T.R. The natural history of hepatitis C virus (HCV) infection. *Int J Med Sci*. 2006;3:47–52. [PubMed]
- Chowdhury A., Santra A., Chaudhuri S. Hepatitis C virus infection in the general population: a community-based study in West Bengal, India. *Hepatol Balt Md*. 2003 Apr;37:802–809. [PubMed]
- Christdas, J., Sivakumar, J., David, J., Daniel, H., Raghuraman, S., Abraham, P. (2013). Genotypes of hepatitis C virus in the Indian sub-continent: A decade-long experience from a tertiary care hospital in South India, *Indian J. Med Microbiol*. 31 (4) : 349-353. DOI: 10.4103/0255-0857.118875,
- Cormier M. (2005). The role of hepatitis C support groups. *Gastroenterol Nurs*. 28(3 Suppl):S4-9
- Denniston M.M., Klevens R.M., McQuillan G.M., Jiles R.B. Awareness of infection, knowledge of hepatitis C, and medical follow-up among individuals testing positive for hepatitis C: national health and nutrition examination survey 2001–2008. *Hepatol Balt Md*. 2012 Jun;55:1652–1661. [PMC free article] [PubMed]
- Gibb D.M., Goodall RL, Dunn DT, et al. *Mother-to-child transmission of hepatitis C virus: evidence for preventable peripartum transmission*. *Lancet* 2000;356:904-7.
- Gower E., Estes C., Blach S., Razavi-Shearer K., Razavi H. Global epidemiology and genotype distribution of the hepatitis C virus infection. *J Hepatol*. 2014 Nov;61(1 suppl):S45–S57. [PubMed]
- Grassi L, Satriano J, Serra A, Biancosino B, Zotos S, Sighinolfi L, et al. Emotional stress, psychosocial variables and coping associated with hepatitis C virus and human immunodeficiency virus infections in intravenous drug users. *Psychother Psychosom*. 2002;71(6):342-9.
- Hauri AM, Armstrong GL, Hutin Y. The global burden of disease attributable to contaminated injections given in health care settings. *Int J STD AIDS* 2004;15:7-16.

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- Kraus MR, Schafer A, Csef H, Scheurlen M, Faller H. Emotional state, coping styles, and somatic variables in patients with chronic hepatitis C. *Psychosomatics*. 2000;41(5):377-84.
- Mehta K.D., Antala S., Mistry M., Goswami Y. Seropositivity of hepatitis B, hepatitis C, syphilis, and HIV in antenatal women in India. *J Infect Dev Ctries*. 2013 Nov;7:832–837. [PubMed]
- Modabbernia , A. ; Poustchi, H., &Malekzadeh, R. (2013).Neuropsychiatric and Psychosocial Issues of Patients With Hepatitis C Infection: A Selective Literature Review. *Hepatitis Monthly*. 13(1): e8340 , DOI: 10.5812/hepatmon.8340
- Mohsen AH, Easterbrook P, Taylor CB, Norris S. Hepatitis C and HIV-1 co-infection. *Gut* 2002;51:601-8.
- Mukhopadhyaya A. Hepatitis C in India. *J Biosci*. 2008 Nov;33:465–473. [PubMed]
- Nelson PK, Mathers BM, Cowie B, et al. Global epidemiology of hepatitis B and hepatitis C in people who inject drugs: results of systematic reviews. *Lancet* 2011;378:571-83.
- Operskalski EA, Kovacs A. HIV/HCV co-infection: pathogenesis, clinical complications, treatment, and new therapeutic technologies. *Curr HIV/AIDS Rep* 2011;8:12-22.
- Pandit D.P., Pagaro M.P., Nabamita C. Prevalence of antibodies to hepatitis C virus in voluntary blood donors: are women better donors? *J Clin Diagn Res JCDR*. 2014 Apr;8:DC20–DC23. [PubMed]
- Perz JF, Armstrong GL, Farrington LA, Hutin Y, Bell B. The contributions of hepatitis B virus and hepatitis C virus infections to cirrhosis and primary liver cancer worldwide. *J Hepatol* 2006;45:529-38.
- Prati D. Transmission of hepatitis C virus by blood transfusions and other medical procedures: a global review. *J Hepatol*. 2006 Oct;45:607–616. [PubMed]
- Price JC, Thio CL. Liver disease in the HIV-infected individual. *Clin Gastroenterol Hepatol* 2010;8:1002-12.
- Puri P., Anand A.C., Saraswat V.A. Consensus statement of HCV task force of the indian national association for study of the liver (INASL). Part I: status report of HCV infection in India. *J Clin Exp Hepatol*. 2014;4:106–116. [PubMed]
- Quarantini LC, Miranda-Scippa A, Batista-Neves S, Powell VB, Abreu N, Abreu KC, et al. A neuropsychological study comparing patients infected with HCV and HBV without psychiatric comorbidities. *J Med Virol*. 2009;81(7):1184-8.
- Rowan PJ, Al-Jurdi R, Tavakoli-Tabasi S, Kunik ME, Satrom SL, El-Serag HB. Physical and psychosocial contributors to quality of life in veterans with hepatitis C not on antiviral therapy. *J Clin Gastroenterol*. 2005;39(8):731-6.
- Schaefer, M., Capuron, L., Friebe, A., Diez-Quevedo C, Robaeys, G, Neri, S, Graham R., Kautz, A., Forton, D., Carmine M. Pariente IS (2012). Hepatitis C infection, antiviral treatment and mental health: A European expert consensus statement. *J Hepatol* .(<http://dx.doi.org/10.1016/j.jhep.2012.07.037>)
- Shepard C.W., Finelli L., Alter M.J. Global epidemiology of hepatitis C virus infection. *Lancet Infect Dis*. 2005 Sep;5:558–567. [PubMed]
- Sievert W., Altraif I., Razavi H.A. A systematic review of hepatitis C virus epidemiology in Asia, Australia and Egypt. *Liver Int Off J Int Assoc Study Liver*. 2011 Jul;31(suppl 2):61–80. [PubMed]
- Singh P., Kaur R., Kaur A. Frequency distribution of hepatitis C virus in different geographical regions of Punjab: retrospective study from a tertiary care centre in North India. *J Nat Sci Biol Med*. 2014 Jan;5:56–58.[PubMed]
- Sockalingam S, Abbey SE, Alosaimi F, Novak M. A review of sleep disturbance in hepatitis C. *J Clin Gastroenterol*. 2010;44(1):38-45.

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- Sood A., Midha V., Bansal M., Sood N., Puri S., Thara A. Perinatal transmission of hepatitis C virus in northern India. *Indian J Gastroenterol Off J Indian Soc Gastroenterol*. 2012 Jan;31:27–29. [PubMed]
- Sood A., Sarin S.K., Midha V. Prevalence of hepatitis C virus in a selected geographical area of northern India: a population based survey. *Indian J Gastroenterol Off J Indian Soc Gastroenterol*. 2012 Sep;31:232–236.[PubMed]
- Treloar C, Hopwood M. "Look, I'm fit, I'm positive and I'll be all right, thank you very much": coping with hepatitis C treatment and unrealistic optimism. *Psychol Health Med*. 2008;13(3):360-6.
- Van der Helm JJ, Prins M, del Amo J, et al.(2011). *The hepatitis C epidemic among HIV-positive MSM: incidence estimates from 1990 to 2007*.25:1083-91.
- Verma R., Behera B.K., Jain R.B., Arora V., Chayal V., Gill P.S. Hepatitis C, a silent threat to the community of Haryana, India: a community-based study. *Australas Med J*. 2014;7:11–16. [PubMed]
- Verma R., Khanna P., Chawla S. *Hepatitis C vaccine*. *Hum Vaccines Immunother*. 2014 Jul;10:1927–1929.[PubMed]
- WHO *Hepatitis C* [Internet]. [cited 2014 Dec 1]. from: <http://www.who.int/csr/disease/hepatitis/whocdscsrlyo2003/en/index4.html>.
- Wilson MP, Castillo EM, Batey AM, Sapyta J, Aronson S. (2010).Hepatitis C and depressive symptoms: psychological and social factors matter more than liver injury. *Int J Psychiatry Med*. 2010;40(2):199-215.
- World Health Organization. Global burden of disease (GBD) for hepatitis C. *J Clin Pharmacol* 2004;44:20
- World Health Organization. *Sixty-third World Health Assembly resolution WHO 63.18: viral hepatitis*. 2010. Available at: http://apps.who.int/gb/ebwha/pdf_files/WHA63/A63_R18-en.pdf. Accessed 4 January 2012.
- World Hepatitis Alliance. *Viral hepatitis: global policy*. Available at: http://www.worldhepatitisalliance.org/Libraries/Campaign_Materials/Viral_Hepatitis_Global_Policy.sflb.ashx. Accessed 3 January 2012.

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