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Original Research Article

Prevalence of hepatitis B and hepatitis C virus infections among patients attending a sub-district government hospital in Kashipur, Uttarakhand: a hospital-based observational study

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ABSTRACT

Background: The hepatitis B virus (HBV) and hepatitis C virus (HCV) infections frequently go unnoticed for years before developing into chronic liver disease, cirrhosis, and liver cancer. Sub-district government hospitals are frequently rural and semi-urban populations' only access to healthcare in India, but prevalence data from this tier are still hard to come by. This study was to ascertain the prevalence of HBsAg and anti-HCV in patients at a sub-district government hospital in Kashipur, as well as to look at variations over time and between the three service arms of OPD, JSY, and family planning.

Methods: This retrospective study was carried out in the laboratory records of L.D. Bhatt Government Sub-District Hospital, Kashipur from April 2025 to February 2026 comprising 6,227 HBsAg and 6,003 anti-HCV tests in OPD, JSY and Family Planning. 95% confidence intervals were used to express the prevalence; z-tests and chi-square tests of homogeneity were employed, with $p<0.05$ being considered significant.

Results: Total 200 of 6,003 people had anti-HCV (3.33%, 95% CI 2.88–3.79%) and 98 of 6,227 people had reactive HBsAg (1.57%, 95% CI 1.26-1.88%). HCV positivity was significantly higher ($z=6.30$, $p<0.001$). Monthly positivity varied significantly from month to month (HBsAg $\chi^2=21.42$, $p=0.018$; HCV $\chi^2=22.89$, $p=0.011$), with a December 2025 spike in HBsAg and a November 2025 spike in HCV driving the range of 0.81% to 3.53% for HBsAg and 1.63% to 5.88% for HCV.

Conclusions: Both infections are still prevalent enough to warrant ongoing screening, with HCV being noticeably more prevalent than HBV. Prenatal HBsAg screening should be universal rather than selective, as evidenced by the high percentage of cases discovered through JSY.

Keywords: Anti-HCV, HBsAg, Hepatitis B, Hepatitis C, JSY antenatal screening, Seroprevalence

INTRODUCTION

Infection with hepatitis B virus (HBV) and hepatitis C virus (HCV) is a major cause of chronic liver disease worldwide. Infection with these viruses is often silent for many years or decades before clinical symptoms develop, at which time cirrhosis or hepatocellular carcinoma may already have developed.[1] The majority of infected persons presenting for general health care services for unrelated complaints are unaware of their infection status.

An estimated 296 million people worldwide live with chronic HBV infection and an estimated 58 million have HCV infection.[2,3] India has no shortage of either. National estimates of HBsAg positivity range from 2% to 8% by region.[4] HCV is less studied, but the challenges are great as there is no preventive vaccine.[5] It is estimated that 75 to 85% of persons infected with HCV will go on to develop chronic infection.[6] The Ministry of Health and Family Welfare has realized the need for upgradation of

facility level data for National Viral Hepatitis Control Programme (NVHCP).[7,8]

Published literature on facility level data from the sub-district level of the health system is relatively limited, that is, hospitals between primary health centres and district hospitals in the referral chain. These facilities typically serve a heterogeneous population comprising urban residents, patients from surrounding rural areas, pregnant women registering for institutional delivery, and people seeking family planning services. The infection risk profile of this population is unique and has a bearing on service planning.

Kashipur is a town in the district of Udham Singh Nagar, Uttarakhand. The economy depends on agriculture, small scale industry and trade. The catchment area is served by the L. D. Bhatt Government Sub-District Hospital as the main public health facility. The objective of this study was to report the prevalence of HBV and HCV infection at this facility over an 11-month period and explore variation by service category and by month.

Aims and objectives

The study aims to determine the prevalence of HBsAg and anti-HCV antibodies among screened patients. It evaluates monthly changes in overall testing volumes and positivity rates. It compares the distribution of HBsAg and HCV infections across OPD, JSY, and Family Planning departments. It tracks and compares the trends of HBV and HCV positivity throughout the 11-month study window.

METHODS

Study type

This was a retrospective, hospital-based observational study. Based on secondary data from routine screening records. No additional tests were ordered, and no patients were directly contacted.

Study place

This study was conducted at L.D. Bhatt Government Sub-District Hospital, Kashipur, Udham Singh Nagar, Uttarakhand. Routine serological screening for blood-borne infections is part of its standard laboratory workload of the hospital's OPD, maternal health (JSY), and family planning services.

Study duration

This study was conducted from April 2025 to February 2026 (11 months).

Study population

Anyone with a recorded HBsAg or anti-HCV test during the study period was included. Testing was carried out across OPD, JSY, and family planning services whenever clinically indicated or as per programme protocol, 6227 for HBsAg and 6003 for anti-HCV during the study period. Cases with unclear or missing results were excluded.

Sample collection and testing

Venous blood (2-3 ml) was collected from each subject under aseptic conditions by trained laboratory staff using sterile disposable syringes. The samples were processed by the standard rapid immunochromatographic kits for the detection of HBsAg and anti-HCV according to the manufacturer's instructions. Positive and negative controls were run in each batch.

Data collection and statistical analysis

Monthly data on numbers tested and reactive were extracted from laboratory registers and service records for the OPD, JSY, and Family Planning units. Prevalence was calculated as (reactive cases/total tested) × 100, with 95% confidence intervals computed using the Wilson score method. Comparison of overall HBsAg and anti-HCV positivity was performed using two-proportion z-test and variation in positivity over the months for each infection was assessed using chi-square tests of homogeneity. The p values of <0.05 were considered statistically significant. Descriptive calculations were performed in Microsoft Excel. Inferential statistics were calculated separately as described above.

Ethical consideration

The laboratory screening records were collected with the permission of the Chief Medical Superintendent, L. D. Bhatt Government Sub-District Hospital, Kashipur, on a formal request from the Department of Zoology, Radhey Hari Government Post Graduate College, Kashipur (Letter No. 12058/2025-26, 11/03/2026). The study did not involve direct patient contact but used only aggregate, anonymized laboratory data, and no patient identifiers were ever recorded or handled. The study was conducted in accordance with the Declaration of Helsinki (2013 revision) and the manuscript was prepared according to the STROBE checklist for observational studies.

RESULTS

Overall infection rates

Across all three service arms, 6,227 individuals were tested for HBsAg and 98 were reactive, a prevalence of 1.57% (95% CI 1.26-1.88%). For anti-HCV, 6,003 individuals were tested and 200 were reactive, a prevalence of 3.33% (95% CI 2.88-3.79%). This difference was statistically significant (two-proportion z-test, $z=6.30$, $p<0.001$), with anti-HCV positivity running consistently higher than HBsAg positivity in this population. During the 11-month period, a total of 298

infected persons were identified across the OPD, JSY, and FP services combined, with the majority identified through JSY, reflecting both its share of testing volume and its share of reactive cases (Table 1).

Table 1: Overall prevalence of HBsAg and anti-HCV infection (April 2025-February 2026).

Parameter	HBsAg	Anti-HCV
Total tested	6,227	6,003
Total reactive	98	200
Overall prevalence (%)	1.57	3.33
95% CI	1.26-1.88	2.88-3.79

Month-wise data

A total of 458 tests were performed in October 2025 and 702 tests were performed in July 2025 for HBsAg. For HCV, the number of tests performed ranged from 323 in November 2025 to 696 in July 2025. This is most likely due to variation in patient attendance and laboratory workload, rather than a change in underlying infection risk, although this could not be confirmed from the available records.

Once JSY and FP testing are included alongside OPD, no month recorded zero HBsAg-reactive cases even the quietest month, June 2025, still had five. HBsAg positivity was lowest in June 2025 (0.81%) and highest in December 2025 (3.53%). HCV positivity was lowest in September 2025 (1.63%) and highest in November 2025 (5.88%) a real shift from the OPD-only figures, where October had looked like the peak month. Having full data for all services, chi-square tests of homogeneity demonstrated that month-to-month variation was indeed statistically significant for both HBsAg (χ^2=21.42, df=10, p=0.018) and HCV (χ^2=22.89, df=10, p=0.011). The spikes observed in December for HBsAg, and November for HCV were the primary drivers, rather than normal sampling noise (Table 2). The trends are summarized in Figures 1 and 2.

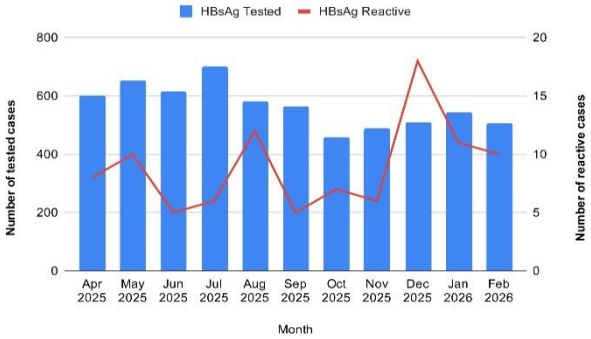


Figure 1: Monthly distribution of HBsAg-tested and reactive cases; bars show the number of individuals tested each month (left axis); the line shows the number of reactive cases (right axis).

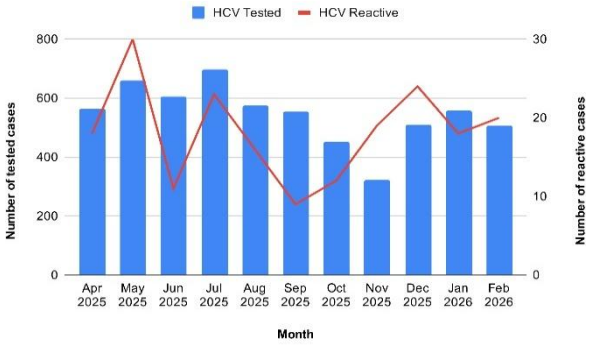


Figure 2: Monthly distribution of HCV-tested and reactive cases; bars show the number of individuals tested for anti-HCV each month (left axis); the line shows the number of reactive cases (right axis).

Table 2: Month-wise distribution of HBsAg and anti-HCV tested, reactive cases, and prevalence.

Month	HBsAg tested	HBsAg reactive	HBsAg prevalence (%)	HCV tested	HCV reactive	HCV prevalence (%)
April 2025	603	8	1.33	565	18	3.19
May 2025	654	10	1.53	660	30	4.55
June 2025	617	5	0.81	604	11	1.82
July 2025	702	6	0.85	696	23	3.30
August 2025	580	12	2.07	576	16	2.78
September 2025	563	5	0.89	553	9	1.63
October 2025	458	7	1.53	451	12	2.66
November 2025	490	6	1.22	323	19	5.88
December 2025	510	18	3.53	509	24	4.72
January 2026	543	11	2.03	559	18	3.22
February 2026	507	10	1.97	507	20	3.94
Total	6227	98	1.57	6003	200	3.33

Service category breakdown

Screening was done at three services points OPD, JSY and FP over the period of 11 months (April 2025 to Feb 2026). The bulk of the testing load fell to JSY with 5,603 (90.0%) of the 6,227 total HBsAg tests, then OPD with 525 (8.4%) and FP with a mere 99 (1.6%) (Table 3 and Figure 3). That gap makes sense if you think about what

each service is for: JSY is linked to institutional deliveries under a government maternal health scheme, so it naturally sees large numbers of pregnant women passing through. FP is a smaller, more focused group coming for counselling on contraception and reproduction and not everybody there is screened for hepatitis, compared to JSY.

Table 3: Month-wise distribution of patients tested for HBsAg under OPD, JSY, and family planning services.

Month	OPD	JSY	FP	Total
April 2025	42	556	5	603
May 2025	61	590	3	654
June 2025	29	584	4	617
July 2025	42	655	5	702
August 2025	41	537	2	580
September 2025	35	527	1	563
October 2025	36	415	7	458
November 2025	54	422	14	490
December 2025	50	438	22	510
January 2026	74	445	24	543
February 2026	61	434	12	507

All three services had reactive cases with JSY again leading the way not surprising, given how many more people it tested. December 2025 was a significant month with 11 positive cases in JSY alone. The reason it matters is because hepatitis B can be transmitted to the baby at delivery if the mother's status is not caught in time. OPD had a more fluctuating pattern month to month, and FP had only one reactive case over the entire study period (December 2025). That doesn't mean FP carries less risk, though it is just a reflection of how few people from that group get screened in the first place. Table 4 shows the monthly reactive cases and prevalence under OPD, JSY, and family planning services. Figure 4 shows this distribution graphically.

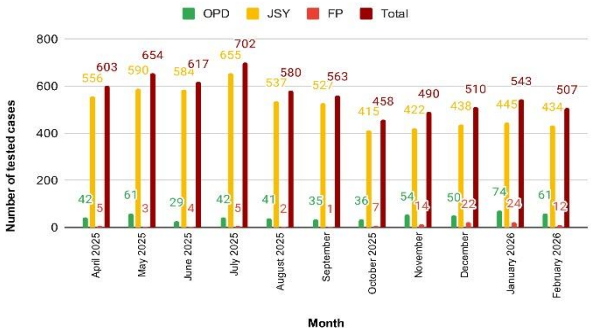


Figure 3: Month-wise distribution of patients tested for HBsAg under OPD, JSY, and family planning services.

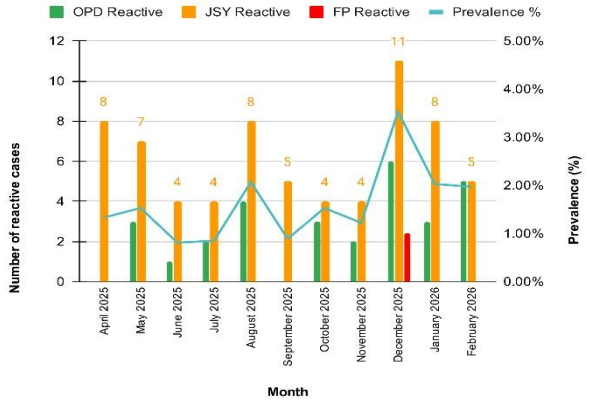


Figure 4: Month-wise distribution of HBsAg-reactive cases and prevalence under OPD, JSY, and family planning services.

Table 4: Month-wise distribution of HBsAg-reactive cases and prevalence under OPD, JSY, and family planning services.

Month	OPD reactive	JSY reactive	FP reactive	Total reactive	Prevalence (%)
April 2025	0	8	0	8	1.33
May 2025	3	7	0	10	1.53
June 2025	1	4	0	5	0.81
July 2025	2	4	0	6	0.85
August 2025	4	8	0	12	2.07
September 2025	0	5	0	5	0.89
October 2025	3	4	0	7	1.53
November 2025	2	4	0	6	1.22
December 2025	6	11	1	18	3.53
January 2026	3	8	0	11	2.03
February 2026	5	5	0	10	1.97

Comparison of HBsAg and HCV prevalence

HCV prevalence was more than HBsAg for all the eleven months. Both had real month-to-month swings when complete OPD+JSY+FP picture is used rather than OPD alone. HBsAg was lowest in June 2025 (0.81%) and highest in December 2025 (3.53% HCV bottomed out at 1.63% in September 2025 and peaked at 5.88% in November 2025. HBsAg prevalence was an overall 1.57% (98 of 6,227 tested) compared with HCV at 3.33% (200 of 6,003 tested), so HCV was obviously the more persistent of the two infections in this population, which differs from several Indian hospital-based studies that

report higher HBsAg than anti-HCV positivity (Figure 5).[9-11]

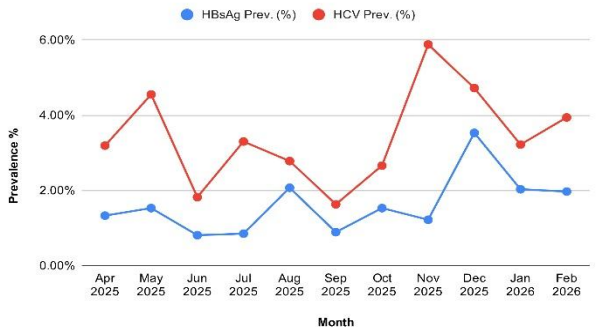


Figure 5: Month-wise comparison of HBsAg and HCV prevalence percentage.

DISCUSSION

The observed HBsAg prevalence of 1.57% (including JSY and family planning testing alongside OPD) is lower than the 2-8% range usually found in Indian hospital-based studies.[4,12] This is likely due to the cohort being heavily weighted towards JSY-linked antenatal screening, a broadly representative obstetric population rather than a higher-risk hospital subgroup. This still supports the conclusion that HBV continues to circulate in this population at a level that justifies continued screening.

The anti-HCV positivity rate of 3.33% is close to the upper end of global population level estimates which are usually 3% to 4%, even in countries with a high burden of HCV.[13] This is still a hospital-based sample and not appropriate for estimating community prevalence, since those who seek care are more likely to be symptomatic or otherwise at greater risk than the general population. Therefore, the figure should be viewed as a facility-level screening yield and not a community estimate. This is higher than the anti-HCV positivity reported from Uttarakhand (1.8%) and from a hospital in Uttar Pradesh (1.76%), though the lack of risk factor data in the present dataset means that the underlying drivers cannot be characterised here.[9,14]

The rate of anti-HCV positivity was significantly higher than that of the HBsAg positivity ($z=6.30$, $p<0.001$). Contrary to the pattern shown by the OPD data alone, the inclusion of JSY and FP testing showed that the month-to-month variation within each infection was statistically significant (HBsAg: $p=0.018$; HCV: $p=0.011$). So, the December 2025 HBsAg peak and November 2025 HCV peak look less like isolated blips and more like real month-specific spikes, although with only eleven months of data it's difficult to say whether they reflect a recurring seasonal pattern or a one-off cluster.

The JSY service arm deserves special mention in that it accounted for screening of more than 90% of all screened persons and effectively served as a de facto antenatal screening exercise. Vertical transmission of HBV from mother to newborn is highly efficient.[15] An HBsAg-positive mother not identified before delivery is a missed opportunity for hepatitis B immunoglobulin and vaccine in the critical first 24 hours of life.[16] The present findings, with 11 reactive cases associated with JSY in December 2025 alone further support the case for universal and not selective testing for HBsAg at the point of JSY registration.

It may also be noted that the coverage of testing was not uniform across the three service arms. JSY had the largest share in testing and reactive cases simply because it caters to a far larger number of patients as compared to the others, while testing in OPD and FP was relatively modest. This is unlikely to be a deliberate gap in care, but rather a combination of kit supply, staff workload and protocol scope at any time. It means that the true burden of infection among all hospital attendees, tested and untested alike, cannot be fully estimated from this dataset alone. It would be reasonable to move to universal, protocol driven screening across all three services, rather than the current selective pattern.

Limitations

This study has few limitations. This was a single-site study, and conclusions should not be generalized to the wider district or region without additional data to support such inference. And it also covers people that came to this government hospital, anybody that never sought care is not part of this picture at all. There was no information about age, sex and risk factors in the records, limiting what can be stated about who and why, unlike community-based studies elsewhere in India that have captured this level of detail.[17] There was also no confirmatory testing, no HBV DNA or HCV RNA work so these numbers are screening results, not confirmed diagnoses. And even at eleven months, the study period is less than a full year, so any real seasonal pattern is still hard to pin down from this alone.

What this study adds

There are few published data on seroprevalence from sub-district hospitals in the Kumaon belt of Uttarakhand. This study contributes to the body of knowledge on resource allocation by providing month-level, service-specific data from an operating facility that may be directly useful to district health officers and NVHCP coordinators. It provides facility-based evidence that routine screening in peripheral hospitals detects infections that would otherwise be missed.

CONCLUSION

Overall, in OPD, combined JSY and Family Planning services, HBsAg positivity was 1.57% and anti-HCV positivity was 3.33% with significantly higher HCV positivity as compared to HBsAg positivity ($p<0.001$). This was through screening over eleven months at this government sub district hospital in Kashipur where 298 otherwise undetected infections were identified. The high

proportion of screening through the JSY arm supports strong evidence for universal antenatal HBsAg testing. These findings support the need for ongoing, systematic screening for both infections at this facility and may guide resource allocation at similar sub-district hospitals in the region.

The present findings suggest that universal HBsAg screening at JSY registration should be made mandatory rather than selective and systematic HCV screening for OPD patients with identifiable risk factors. At the community level, a stronger uptake of hepatitis B vaccination especially among pregnant women and adolescents and periodic audits of injection safety and sterilisation practices at the facility would facilitate building on what this study has found. A multi-centric study across hospitals in the Kumaon region would also give a more authentic picture of the regional burden of infection.

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Funding: NT designed the study, carried out the data collection, literature search, analysed the results, drafted and edited the manuscript. ACM conceived and designed the study, supervised the work, and reviewed and approved the final manuscript
Conflict of interest: None declared
Ethical approval: Access to laboratory screening records was granted by the Chief Medical Superintendent, L.D. Bhatt Government Sub-District Hospital, Kashipur, following a formal request from the Department of Zoology, Radhey Hari Government Post Graduate College, Kashipur (Letter No. 12058/2025-26, dated 11/03/2026)

REFERENCES

1. Perz JF, Armstrong GL, Farrington LA, Hutin YJ, Bell BP. The contributions of hepatitis B virus and hepatitis C virus infections to cirrhosis and primary liver cancer worldwide. J Hepatol. 2006;45(4):529-38.
2. World Health Organization. Global Hepatitis Report 2024, 2024. Available at: https://www.who.int/hepatitis. Accessed 15 May 2026.
3. Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Estimations of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. Lancet. 2015;386(10003):1546-55.
4. Batham A, Narula D, Toteja T, Sreenivas V, Puliyel JM. Systematic review and meta-analysis of prevalence of hepatitis B in India. Indian Pediatr. 2007;44(9):663-74.
5. Messina JP, Humphreys I, Flaxman A, Brown A, Cooke GS, Pybus OG, et al. Global distribution and prevalence of hepatitis C virus genotypes. Hepatol. 2015;61(1):77-87.
6. Ghany MG, Strader DB, Thomas DL, Seeff LB. Diagnosis, management, and treatment of hepatitis C: an update. Hepatol. 2009;49(4):1335-74.
7. Ministry of Health and Family Welfare, Government of India. National Guidelines for Diagnosis & Management of Viral Hepatitis, 2018. Available at: https://nvhcp.mohfw.gov.in/common_libs/diagnosis-management-viral-hepatitis.pdf. Accessed 15 May 2026.
8. Ministry of Health and Family Welfare (MoHFW), Government of India. National Viral Hepatitis Control Programme: Operational Guidelines, 2018. Available at: https://nvhcp.mohfw.gov.in/common_libs/Operational_Guidelines.pdf. Accessed 15 May 2026.
9. Agarwal L, Singh AK, Agarwal A, Singh RP. Incidental detection of hepatitis B and C viruses and their coinfection in a hospital-based general population in tertiary care hospital of Uttar Pradesh. J Fam Med Prim Care. 2018;7(1):157-61.
10. Mahalakshmi PA, Gowtham RR, Mudhigeti N, Pamireddy ML, Meenakshi K, Nallapireddy U, et al. Seroprevalence and trend of hepatitis B and C viral infections in patients at a tertiary care hospital in southern India: a retrospective study. J Clin Diagn Res. 2020;14(1):DC08-12.
11. Jain RK, Shrivastava R, Jain SK, Chaurasia D, Jain A, Jain S, et al. Seropositivity and coinfection of hepatitis B and hepatitis C viruses in Central India: a hospital-based study. J Fam Med Prim Care. 2024;13(10):4413-8.
12. Acharya SK, Madan K, Dattagupta S, Panda SK. Viral hepatitis in India. Nat Med J India. 2006;19(4):203-17.
13. Mohd Hanafiah K, Groeger J, Flaxman AD, Wiersma ST. Global epidemiology of hepatitis C virus infection: new estimates of age-specific antibody prevalence. Hepatol. 2013;57(4):1333-42.
14. Mittal G, Gupta P, Gupta R, Ahuja V, Mittal M, Dhar M. Seroprevalence and risk factors of hepatitis B and hepatitis C virus infections in Uttarakhand, India. J Clin Exp Hepatol. 2013;3(4):296-300.
15. Shepard CW, Simard EP, Finelli L, Fiore AE, Bell BP. Hepatitis B virus infection: epidemiology and vaccination. Epidemiol Revi. 2006;28:112-25.
16. Puri P. Tackling the hepatitis B disease burden in India. J Clin Experiment Hepatol. 2014;4(4):312-9.
17. Chandra M, Khaja MN, Farees N, Poduri CD, Hussain MM, Aejaz Habeeb M, et al. Prevalence, risk factors and genotype distribution of HCV and HBV infection in the tribal population: a community based study in south India. Trop Gastroenterol. 2003;24(4):193-5.

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