

## Seroprevalence of Hepatitis B and C among Residents of Guilan Nursing Home

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**Background and Aims:** Viral hepatitis represents one of the most significant public health challenges. The institutionalization itself is an important factor influencing the risk and frequency of exposure and further spread of HBV and HCV infections. This study was carried out to determine the frequency of HBV and HCV serological markers in residents of Guilan nursing home.

**Methods:** Demographic data and history of exposure to known risk factors were collected by interview and through medical records available at the nursing home; clinical information was obtained via examination. All residents were screened for markers of HBV and HCV. HBsAg or HCVAb positive cases were examined for HBeAg, HBcAb, and HCV-RNA, respectively; and complementary tests including AST, ALT, ALP, bilirubin, serum albumin, and prothrombin time (PT) were done.

**Results:** 383 residents of Guilan nursing home including 243 females (63.4%) with mean age of  $58.4 \pm 21.9$  years were investigated. The average duration of residency was  $6.0 \pm 5.7$  years. Nine cases (2.3%) including 6 males (4.2% of all males) were anti-HCVAb positive. Out of these 9 cases, 5 individuals were HCV-RNA positive. All of these 5 cases were male. The average duration of residency in HCV positive cases was  $1.5 \pm 1.8$  years in comparison with  $6.1 \pm 5.8$  years in negative cases. There was a significant reverse relationship between residency duration and HCV positivity in logistic regression.

**Conclusions:** Residency in nursing home is not an important risk factor for viral hepatitis transmissions. However; we recommend precise and complete viral hepatitis screening on admission to nursing home and HBV vaccination for HBV negative cases.

**Keywords:** Nursing Home, Hepatitis B, Hepatitis C

### Introduction

Viral hepatitis represents one of the most significant public health challenges in the new millennium, particularly for people living in developing countries <sup>(1)</sup>. Residents in the nursing home should consider as being a high-risk group for HBV and HCV infections <sup>(2, 3)</sup>. The spread of parenterally transmitted viruses, such as HBV, HCV, and HDV occurs in homes for the aged and people with intellectual disability, mainly through the common use of toiletries and non-disposable syringes; taking objects in the mouth and sharing food; small injuries inflicted by themselves or others; dribbling or spitting; scratching and biting; self-mutilation; unhygienic toilet habits; and bleeding lips and gums caused by antiepileptic medication <sup>(4, 5)</sup>.

Researchers found double the prevalence of anti-HBc in institutionalized patients compared to non-institutionalized subjects <sup>(6)</sup>. Other researchers reported that 50% of the seronegative newcomers

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to institutions were infected with HBV in the first 1.5-2.5 years <sup>(7)</sup>. A New-Zealand cross sectional study showed that a resident's risk of being infected increased by  $\approx 17\%$  for every year spent in an institution <sup>(8)</sup>. Improvement in hygiene standards has lead to a marked decrease in these infections <sup>(5)</sup>. This study was carried out to determine the frequency of HBV and HCV serological markers in residents of Guilan nursing home.

## Materials and Methods

This analytic cross-sectional study from May to October 2003 assessed the prevalence and risky behaviors associated with HBV and HCV seropositivity among 383 residents of Guilan nursing home. Demographic data and history of exposure to blood/blood products, surgery or other known risk factors were collected by interview and through persons' medical records available at the nursing home. All patients were examined by a physician focusing on detecting icter, ascites, liver span and probable spleen span.

They, all were screened for markers of HBV and HCV. For detection of HBV, HBsAg was determined using commercially available enzyme immunosorbent assay (ELISA) kits (Hepanostika HBsAg Uni-Form II Microelisa System, Organon Teknika, Netherlands). Positive samples were rechecked for HBsAg and detected for HBeAg and HBcAb. For HCV infection, anti-HCVAb was detected using ETI-HCV k-30 Diasorin, Spain. Positive results of anti-HCVAb were confirmed with the polymerase chain reaction (PCR). For all positive cases, AST, ALT, Alkaline phosphatase (ALP), bilirubin, serum albumin, and prothrombin time (PT) were checked. SPSS 11.5 software was used in analysis.  $P < 0.05$  was considered statistically significant. The study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki.

## Results

Of 383 subjects with mean age of  $58.4 \pm 21.9$  years, 243 (63.4%) were female. The average length of residency was  $6.0 \pm 5.7$  years (range: 1 month-30 years). Ninety-eight persons (25.6%) were mentally retarded. One-hundred and seventy-three (47.5%) were physically handicapped. Five persons (1.3%) had history of blood transfusion and nobody had history of liver, renal disease or hemodialysis. Seventy-three persons (19.0%) had a history of

surgery. Two persons (0.6%) had positive HBsAg, who were both male. HBcAb was positive in only one of them and none of them had HBeAg. Nine subjects (2.3%) had positive HCVAb, of whom 6 cases were male; all confirmed cases with PCR were male. It means 4.2% of males and 1.2% of females ( $P=0.06$ ,  $OR=3.58$ ,  $CI\ 95\%=0.9-14.5$ ). The mean duration of residency in HCVAb positive cases was  $1.8 \pm 1.6$  years and in HCVAb negative cases was  $6.1 \pm 5.8$  years.

In logistic regression analysis, a significant reverse relationship was found between the length of residency and positive HCVAb test (Table 1). Among persons with a history of surgery, only 2 persons had HCVAb positive test. No person with a transfusion history had positive HBV or HCV test. In all positive cases, PT, serum albumin, bilirubin, and AST were in normal ranges, but ALP was raised in all of them and ALT was raised in 2 HBsAg positive cases and 2 HCVAb positive cases.

**Table 1.** Logistic regression analysis of risk factors.

Risk factor	Odds ratio	95% CI *
Male sex	3.58	0.9-14.5
Short duration of residency in nursing home †	42.2 **	5.3-335.7
Transfusion history	8.9	0.8-93.9
Mental retardation	1.0	0.5-1.9
Physically handicap	9.9	1.3-12.5
History of surgery	17.0	4.5-96.9

\* CI: Confidence interval

\*\* Odds ratio is statistically significant.

† Short duration:  $\leq 1.6 \pm 1.8$  years

## Discussion

The institutionalization itself is an important factor influencing the risk and frequency of exposure and further spread of HBV and HCV infections <sup>(7)</sup>. In current study, the frequency of HCV in the nursing home was 2.3%. This frequency was reported 1.4-2.2% among other nursing homes in other countries <sup>(9, 10)</sup>. Although, in an Italian study, HCVAb was positive in 11.8% elderly in the nursing home and 11.1% in the open elderly population <sup>(11)</sup>.

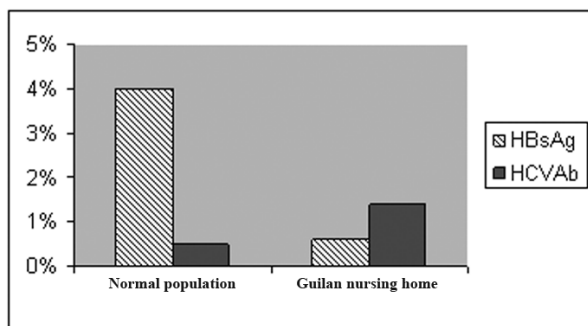
With respect to the duration of residency in the nursing home, HCVAb positive cases in our study had a shorter duration than healthy residents, this finding suggested that the rate of community-acquired HCV was more than nursing home-acquired, since the newcomers showed more HCV positivity than long-term residents. These results are

in concordance with Floreani's results which showed the elderly have very few opportunities to become infected, even in a close cohabitation system (12).

In our study, males exhibited a higher prevalence of HCVAb than females; although this difference was not statistically significant, it can be explained by the few numbers of positive cases, and it would be significant with the large number of positive cases. In the current study, the frequency of HBsAg in the nursing home was 0.6%, and it is similar to other studies with frequency of 0-0.7 % (7, 10, 13, 14). On the other hand, all persons with negative HBsAg at the time of admission remained negative for HBsAg test.

Although transfusion is one of the most important risk factors of HCV or HBV infection (12, 15), none of the residents with a history of transfusion had positive tests. Regarding the prevalence of HBsAg and HCVAb in normal population, we found that the prevalence in Guilan nursing home is significantly lower than that in normal population ( $P < 0.05$ , Figure 1). These findings implied that residency in the nursing home is not a significant risk factor for viral hepatitis (B and C) transmission, however; it is highly recommended that before admission all cases before admission be tested for viral hepatitis and be vaccinated for HBV if not infected (11).

In conclusion, residency in nursing home is not an important risk factor for viral hepatitis transmissions. However; we recommend precise and complete viral hepatitis screening on admission to nursing home and HBV vaccination for HBV negative cases. Also, it is suggested that facilities for old residents be isolated from mentally retarded subjects.



**Figure 1.** The comparison of HBsAg and HCVAb between the nursing home and normal population [16, 17].

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