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## Letter to the Editor

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**Dear Editor**

I read with much enthusiasm the article by Dr. Merat et al. in the latest issue of your prestigious journal.<sup>1</sup> The authors have performed a difficult study and provided valuable information regarding hepatitis B in Iran. But there are some points which I would like to raise regarding this study:

1) Although the study has covered large number of people in three different provinces, these selected areas cannot be considered representative of the whole country regarding demographic characteristics.

2) Their conclusion regarding living in rural areas as a risk factor for hepatitis B should be regarded skeptically. Considering the data provided in the article, the rural areas of Hormozgan have not been covered. In addition, the rural population covered in Tehran is about 5% of the sample standing for less than 120 people. Considering the population structure of Tehran where about 10% of the population live in rural areas (Table 1 of Merat et al.'s study), this is an under-representation of the rural subjects in their sample. So, only the Golestan sample contains enough rural people. But the authors have stated that regarding the high missing values for risk factors in Golestan, the Golestan data were not included in the multivariate analysis. Therefore, the data on which the conclusion of "rural residence is a risk factor for hepatitis B" is based on assessing less than 120 people residing in rural areas of Tehran and this strongly raises the possibility of significant selection bias. There are no tables showing the actual rates of HBsAg carrier state or HBcAb positivity in rural and urban areas in the three provinces assessed. Such a table would have been very clarifying. The authors could have assessed the contribution of living in a rural area to hepatitis B carrier state only in Golestan Province. And then it should be explicitly mentioned that the results are applicable to Golestan and its extrapolation to other parts of the country needs further assessment in other provinces.

3) The comparison of findings of this study with the data previously obtained from healthy blood donors does not seem logical, as the blood donors are not representative of the general population regarding issues like chronic viral hepatitis. Blood donor information points to the

minimum prevalence of hepatitis B in the population and this should be noted when comparisons are made.

4) Another risk factor identified in this study is "increasing age". Looking at Figure 1 it seems that those above 55 years of age have the highest prevalence of hepatitis B carrier state and those between 18 and 25 years have the lowest prevalence. Could this be a "cohort effect" reflecting changes in general sanitary and hygienic conditions in the community rather than a true increase in prevalence with age? Those who are now above 55 years have been born in an era when general living conditions have changed dramatically in the country and those between 18 to 25 years have been born in the post Iran-Iraq war, when again the general living conditions have changed. I believe this warrants further ponder.

**Reference**

- 1 Merat S, Rezvan H, Nourai M, Jamali A, Assari S, Abolghasemi H, et al. The prevalence of hepatitis B surface antigen and anti-hepatitis B core antibody in Iran: a population-based study. *Arch Iran Med.* 2009; **12**: 225 – 231.

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**Authors' Reply**

With great interest we read the comments by Dr. Nasserri Moghaddam on our paper reporting the prevalence of hepatitis B virus (HBV) infection in three provinces of Iran. He describes important points which need further discussion and clarification.

As we have mentioned in our paper, any report on the prevalence of HBV infection in Iran, including ours, should be viewed cautiously with careful attention to the population studied.<sup>1</sup> The rates we have reported can only be representative of the three provinces studied and are only a rough estimate of the prevalence of HBV infection in the whole country. In fact it may not be lexically correct to talk about the prevalence of HBV infection in Iran as a whole.

The percentage of our subjects from rural area of Tehran is 5.2% (95%CI: 4.3 – 6.2) and is not

different from the percentage of adult population living in rural area (<8.7%). So, we do not believe that we have any under sampling in Tehran's rural area. Actually the sample we have is quite representative.

For Golestan, the frequency of HBsAg is 6.5% in rural and 3.6% in urban (OR=1.8,  $P=0.005$ ). These figures are 41.6% and 30.4% for anti-HBc (OR=1.6,  $P<0.001$ ). Current data show that a higher risk of rural area for HBV infection is generalizable to Golestan for point estimates. For multivariate analysis, OR of rural area (adjusted for age) is 2.8 ( $P<0.001$ ) for HBsAg and 2.7 ( $P<0.001$ ) for anti-HBc. So, our estimates of OR do not seem to be affected by this exclusion. Nevertheless, we agree that our approach to data analysis may have some limitations related to external validity concerns.

It is true that blood donors are not representative of the general population, but the earlier studies in Iran were performed only on blood donors. Population-based studies have become available only in the recent years. We have

compared our results with both blood donor studies and population-based studies.

The living conditions and general hygiene have greatly improved in the recent decades. Thus, the correlation we observed between the prevalence of HBV infection and increasing age could well be a "cohort effect". Even so, increased age is associated with higher prevalence of HBV infection and older age should be accounted for, as a risk factor, in health programs.

## Reference

- 1 Merat S, Rezvan H, Nouraie M, Jamali A, Assari S, Abolghasemi H, et al. The prevalence of hepatitis B surface antigen and anti-hepatitis B core antibody in Iran: a population-based study. *Arch Iran Med.* 2009; **12**: 225 – 231.

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