FACTORS ASSOCIATED WITH HEPATITIS B IN PRISON POPULATION: INTEGRATIVE REVIEW

ABSTRACT
Objective: to analyze from the literature the main factors associated with HBV infection in the Prison System, with the necessary preventive measures. Method: integrative review aimed at answering the question << What are the factors associated with infection by the hepatitis B virus in prison system, and what preventive action should be taken? >>. For the selection of the sample, databases MEDLINE, LILACS and IBECS were consulted, from 2009 to 2013. In the end, there were 13 articles used, and the discussion guided by two perspective: factors associated with HBV infection and prevention strategies to HBV in the prison environment. Results: there was an association with age, injecting drug use, low education, tattooing and unprotected sex. The prevention measures recommended to HBV were vaccination, health education, regular HIV testing and adoption of harm reduction strategy. Conclusion: the existence of factors associated with hepatitis B shows that organizational changes in prison institutions are necessary to combat the spread of disease in the population. Descritores: Prisons; Hepatitis B; Review.

RESUMO

FACTORES ASOCIADOS À HEPATITIS B EM POPULAÇÃO CARCERÁRIA: REVISÃO INTEGRATIVA

FACTORES ASOCIADOS A LA HEPATITIS B EN LA POPULACIÓN CARCELARIA: REVISIÓN INTEGRADORA

Andréia Alves de Sena Silva¹, Telma Maria Evangelista de Araújo²

Resultados: se observó asociación con edad avanzada, uso de drogas inyectables, baja escolaridad, tener tatuaje y relación sexual desprotegida. Como medidas de prevención se recomienda la vacunación contra el HBV, educación en salud, test serológico periódico y adopción de la estrategia de reducción de daños. Conclusión: a existencia de factores asociados a la Hepatitis B muestra que mudanzas organizacionales en las instituciones de penitenciaría son necesarias para combatir la propagación de la enfermedad en la población. Descritores: Prisiones; Hepatitis B; Revisión.
**INTRODUCTION**

Infection with hepatitis B virus (HBV) is one of the challenges of public health services worldwide and requires specific prevention actions especially for the most vulnerable population, including the Prison System internee. Currently, controlling these problems, the Ministry of Health aims to prevent new cases and to ensure quality of life for carriers.

By a significant number of cases of hepatitis in the prison population, it considering the occurrence, among other factors that in 2003 the Ministerial Decree Number 1777 of 09 September was published, approving the National Health Plan for the Prison System, product of a partnership of the Ministry of Health and Justice, in order to provide comprehensive health care of the prison population. Among the plan’s priorities, there are the implementation of specific protection measures, such as vaccination against hepatitis B; implementation of actions for the prevention of hepatitis and STD/AIDS and condom distribution and inputs to reduce harms associated with drug use.1-2

Notified cases of hepatitis B increased significantly over the years. From 1999 to 2011, 120,343 confirmed cases were reported in the Notifiable Diseases Information System (SINAN). Studies show that such prevalence in proportion are usually higher in people living in criminal regime, for example 19.5% for HBV in a prison in Ribeirão Preto (SP); 26.4% in a prison in Goiânia (GO) and 27.2% in Iran.4-6 These data justify why HBV infection, as well as HCV and HIV, are study problems in the prison system in various parts of Brazil and worldwide.7 In addition to this fact, there is the precarious conditions that such patients have within the prisons, being a limiting factor in combating such diseases, once internee carriers become sources of propagation and maintenance of these viruses.

It is understood that associated with serological infection there are risk factors and behaviors that influence and contribute in maintaining the chain of transmission of hepatitis B in prisons. Knowledge of these vulnerabilities allows the adoption of preventive and protective measures adequate to the living conditions of this population. Faced with the high prevalence observed above, this study aims to:

- Analyze from the literature the main factors associated with HBV infection in the prison system, with the necessary preventive measures.

**METHOD**

Integrative review is a research method that enables the synthesis of knowledge on a particular subject while supporting decision making and behavior improvements, integrating studies with different methodologies about the studied subject. To this end, the following steps are run through: establishment of research and objective issue; establishment of exclusion and inclusion of articles for the sample; categorization of studies (summarization of information extracted from selected studies); assessment of included studies (data analysis); interpretation of results (discussion of results) and, finally, presentation review with an synthesis of the knowledge acquired.8

The research emerged from the next question: what are the factors associated with infection by the hepatitis B virus in prison Systems, and what preventive action should be taken?

To select the sample, Virtual Health Library (VHL) was used because it is a meta-base containing renowned databases. This allowed a greater number of studies being found. The following inclusion criteria were: articles published in Portuguese, English or Spanish, available online in full text available, published in the last five years (2009-2013); articles of original studies; and that matched the research question. Exclusion criteria were: editorial texts and letters to readers; any article that did not meet the inclusion criteria.

The selection of articles was using the keywords “Hepatitis B” and “prisons” in the search field that incorporated in the search title, abstract and subject, in order to answer the research question. The Boolean expression “and” was used with the descriptors corresponding insertion of two or more words. The filters used in the portal respected the inclusion criteria, being found in the search result of articles in databases: Medical Literature Analysis and Retrieval System Online (MEDLINE), Latin American and Caribbean Health Sciences (LILACS) and Spanish Index Library on Health Sciences (IBECS). After applying the filters, there were 13 articles analyzed.

For the extraction of information from selected articles, a data collection instrument was used validated by Ursi (2005), divided into five blocks: identification of the study; institution study; type of publication;
methodological characteristics of the study and assessment of the methodological rigor, which will form a concise database and easily accessible. To facilitate the analysis, a summary table containing important aspects of the studies was built: title, study place, publication year, journal, objectives and main results. 

Studies on the level of scientific evidence were also classified in order to observe the quality of the studies included for analysis. It was considered at level one, results of the meta-analysis of multiple controlled and randomized clinical studies; at level two, results in studies with experimental design; at level three, results almost-experimental studies; at level four, descriptive studies (non-experimental) or qualitative approach; at level five, evidence from case reports or experience and at level six, evidence based on experts opinions.

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After extensive reading of texts and thematic analysis of the contents, a synoptic figure was built in order to facilitate the analysis (Figure 2) and two perspectives to guide the discussion have been prepared: factors associated with HBV infection and HBV prevention strategies in the prison environment, highlighting the contributions of integrative review conducted, which enabled the synthesis of knowledge of the subject studied.

The research resulted in 266 studies found. After observing the inclusion criteria and filters listed in the database, there were 48 articles. Proceeding with the reading of the 48 summaries, noting its relationship with the studied problem, there were 13 articles for final analysis. Figure 1 shows all the process of data collection:

**RESULTS**

Most of the articles selected were published in 2010 (n=05), followed by 2011 (n=04), 2013 (n=03) and 2012 (n=01). It is noteworthy that 92.3% of the studies found were published in English, followed by articles in Spanish. In addition, it was observed that in recent years, discussion of the risks associated with HBV infection is a worldwide, existing research on the topic in prisons in various continents, especially to America and Europe.

It was observed that the journals included in this analysis have focused on Public Health and the Communicable Diseases. There was a predominance observed of quantitative approach in the analysis of these research data, corresponding to almost all studies, except for one case report study. With the predominant approach, the cross-sectional design was present in 84.6% of the studies. Statistical analysis of the research data was done through univariate and multivariate analysis, and use of parametric tests or not, looking for associations between variables in order to highlight risks and chances related to illness through HBV.

The studies showed a good level of evidence in general, in which 7.69% were classified at level 1, 84.61% at level 3 and 7.69% at level 5. The prevailing scenario was the prison environment, with people living in deprivation of liberty or who have already had this condition.
<table>
<thead>
<tr>
<th>Title</th>
<th>Place</th>
<th>Journal/Year</th>
<th>Objective</th>
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<tbody>
<tr>
<td>Seroprevalence of hepatitis B virus infection and associated factors</td>
<td>Brazil</td>
<td>Revista da Sociedade Brasileira</td>
<td>To estimate the prevalence of HBV infection and associated factors among prisoners in Campo Grande, MS.</td>
</tr>
<tr>
<td>Viral hepatitis B, C and HIV infection in Croatian prisons.</td>
<td>Croatia</td>
<td>Epidemiol. Infect./2010</td>
<td>To examine the prisoners’ structure in Croatia, the prevalence of antibodies to HBV, HCV and HIV, co-infection of HBV/HCV, the percentage of infection by HBV and HCV in prisons and percentage of prisoners vaccination.</td>
</tr>
<tr>
<td>Human immunodeficiency virus, hepatitis B and hepatitis C in an</td>
<td>Indonesia</td>
<td>Tropical Medicine and International</td>
<td>To determine the prevalence and behavioral correlates of HIV, HBV and HCV among prisoners in Indonesia and to examine the impact of voluntary counseling and testing.</td>
</tr>
<tr>
<td>HIV and Hepatitis B and C incidence rates in US correctional</td>
<td>USA</td>
<td>BMC Public Health/2010</td>
<td>Systematic and meta-analysis review to describe the incidence of HIV in US correctional institution, comparing the high-risk groups for this infection and compare the HIV incidence rates with HBV and HCV.</td>
</tr>
<tr>
<td>Hepatitis B en el establecimiento penitenciario de La Dorada,</td>
<td>Colombia</td>
<td>MedUNAB/2011</td>
<td>To confirm outbreak of Hepatitis B in prison environments of Caldas, Colombia and to discover knowledge, attitudes and practices about the infection among internees, guards and administrative staff.</td>
</tr>
<tr>
<td>Sexually Transmitted infections and Hepatitis in Men With a History</td>
<td>USA</td>
<td>Sexually Transmitted Diseases/2011</td>
<td>To describe the prevalence of STDs, HBV and HCV and among young men released from prison, and the factors associated with these infections in Mississippi, Rhode Island, Wisconsin.</td>
</tr>
<tr>
<td>Hepatitis C and B testing in English prisons is low but increasing.</td>
<td>England</td>
<td>Journal of Public Health/2011</td>
<td>To describe the characteristics of the tested prisoners and associated risk factors for the positive anti-HCV, the trends over time tests and estimate the proportion of the prison population tested.</td>
</tr>
<tr>
<td>Hepatitis C and B prevalence in Spanish prisons.</td>
<td>Spain</td>
<td>Eur J Clin Microbiol Infect Dis/</td>
<td>To determine the prevalence of factors associated with hepatitis C (HCV) and B (HBV) virus in Spanish prisoners.</td>
</tr>
<tr>
<td>Year</td>
<td>Country</td>
<td>Title</td>
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<tr>
<td>2011</td>
<td>England</td>
<td>Hepatitis B vaccination coverage and uptake in prisons across England and Wales 2003-2010: a retrospective ecological study.</td>
<td>Vaccine 30/2012. To describe the performance of the hepatitis B vaccination program in prisons and examine the data by geographic region and category of the prison.</td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>Epidemiology of the viral hepatitis B and C in female prisoners of Metropolitan Regional Prison Complex in the State of Goiás, Central Brazil.</td>
<td>Revista da Sociedade Brasileira de Medicina Tropical/2013. To investigate the prevalence and risk factors associated with HBV and HCV and genotypes identified among female prisoners in Goiás, central Brazil.</td>
</tr>
<tr>
<td></td>
<td>Iran</td>
<td>Risk Prison and Hepatitis B Virus Infection among Inmates with History of Drug Injection in Isfahan, Iran.</td>
<td>The Scientific world Journal/2013. To evaluate the association of prison factors with HBV infection in prisoners with a history of injecting drugs in Iran.</td>
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Figure 2. Main characteristics of selected articles about factors associated with hepatitis B infection in prison system. Teresina/PI, 2014.
**DISCUSSION**

**Factors associated with HBV infections**

Infectious diseases transmission such as viral hepatitis B and C, HIV, sexually transmitted diseases, tuberculosis, among others, are higher in prisons, due to several factors such as overcrowded cells; diversity of customs and social practices of the detainees; high risk behaviors; multiple sex partners; illicit drug dependence, including injecting; low socioeconomic status and precarious health conditions in these environments.\(^{11,4-5}\)

Most of the studies analyzed (69.23%), had a prevalence of hepatitis B in the study population ranged from 18.9% to values below of what is found in the general population, such as 1%.\(^{5,12}\) The highest rates were found in South America, especially Brazil, whereas the lower were found in Europe and North America, particularly the United States.\(^{5,12-19}\)

In this regard, it is important to note the difference in the organization of the penal system between these regions. It was possible to observe the differences of the structure, the existence of monitoring infectious diseases programs, routine of HIV testing during admission of internees and use of harm reduction strategy, in the countries of South America when compared to other regions.

The analysis identified the following factors associated with prevalence rates: advanced age (over 30 years old); low education; injecting drug use; have tattoo; prison time; sexual relationship with STD carrier; HIV infection; sexual partnership with prison mate and multiple incarceration.\(^{13,5,17,22}\)

In addition, it was also observed increased risk in people with psychiatric disorders and personality disorders.\(^{15}\) Only one study has linked more education to that infection.\(^{12}\)

Advanced age has been commonly associated with infection by hepatitis B, independent of the studied public. Overtime, there is an accumulation of experienced behavioral risks, whether related to sexual activity, drug use or percutaneous exposures.\(^{13,20,22}\) Thus, the low educational level has been associated\(^{21-22}\), since usually refers to less understanding and understanding of information generally, likely hindering the assimilation of preventive strategies before transmission way of such infections.

The injecting drug users (IDUs) have a strong relationship with the transmission of viral hepatitis, being populations at risk by sharing materials used for consumption. One of the studies highlighted the high prevalence among IDUs (26.2%),\(^{15}\) however, another one only found relationship after conducting statistical adjustment (3.4%).\(^{16}\) Another way of parenteral exposure was highlighted: Have a tattoo. Epidemiological investigation in the United Kingdom discovered a case of transmission within the prison for sharing needle for tattoos among prisoners.\(^{11}\) In Indonesia, the internees who had tattoo showed the strongest association with the presence of HBV.\(^{16}\) The practice of tattooing in prison is a high risk to get ill, being carried out by people without skills by using homemade and inadequate equipment, and by being commonly shared.\(^{11}\)

Factors related to incarceration, such as detention time and multiple arrests were also related. The higher the time and reclusion, the greater is the prevalence of HBV. In Iran, there was OR: 5.67 and OR: 7.39 for the multitude of arrest and incarceration time, respectively\(^{5}\). In Brazil, the chance was lower, however, significant. Being arrested more than three times is associated with 1.9 times higher risk of HBV infection.\(^{13}\)

Inappropriate sexual behavior also\(^{15}\) have risks for the transmission of this disease. The multiplicity of sexual partners and unprotected sex increase the risk of acquiring STDs and contribute to the percentage of co-infections among prisoners.\(^{5,7,17,22}\) In prisons of Spain, the multivariate analysis associated with HBV infection with HIV.\(^{17}\) In the case of co-infection, several studies have shown the existence of HBV shared with other diseases, such as HCV (0.3%, 0.9%, 1.1%, 6.1%)\(^{17,24,18,15}\) HTLV-1/2 (0.3%)\(^{18}\) and HIV (1.5%)\(^{15}\), worrying fact showing the permanence of the transmission chain of these diseases in prison environment.

Some research, although estimating the prevalence and subjecting the interview investigated showed no association of HBV to any other factor, then, measuring the risk or observation of the common characteristics among the positive cases. In Croatia, there was the additional risk in internees with psychiatric problems and personality disorders. The prevalence was 19.0% in this group. It is believed that the increased use of injecting drugs by them favors the transmission.\(^{15}\)

The search for serological markers of HBV allowed some studies affirm the vulnerability of internees to acquire the infection by measuring anti-HBs, antibody to hepatitis B surface antigen. The presence of this marker suggests immunity against hepatitis B. The rates found ranged from 43% in the USA to 24% in Brazilian prisons, suggesting that
improvements in vaccination campaigns in these establishments should be made.12,15
However, not only the non-vaccination but also the low response rate found may be the result of other factors, such as: inadequate conditions related to the vaccine or its administration, not completeness of the vaccine (dose regimen) and no seroconversion.5,12,15

♦ Prevention strategies to HBV in the prison environment

Health work of the World Health Organization in Prisons, says that to prevent the spread of communicable diseases, the weakest links of the triad agent-transmission-host should be the subject of actions in order to stop the continuity of the chain24. Internees from the prison system, when acquiring the infection within the prison and then being free, are crucial in maintaining the infection in the population.19 Thus, preventing this problems becomes the only alternative.

The prevention strategies being in line with the risk factors associated with more frequent risk behaviors observed in the already infected population are important. However, there are studies that consider vaccination against hepatitis B the best way of prevention, especially in the injecting drug users.13,15 The full vaccination scheme has the potential to protect the imprisoned and the community.13

The Center for Infectious Diseases (CDC) recommends vaccination of young and adults people in correctional institutions26, preferably with routine and systematic way, ensuring the effectiveness of the practice. However, research in England showed that acceptance in taking the vaccine was low, given the existence of internees resistant to collaborate with preventive action, recommending improvements in the way of offering immunization to prisoners11.

Besides vaccination, WHO also recommends measures such as the practice of counseling; health education, with delivery of educational material; provision of condoms; adoption of harm reduction strategies by providing sterile injection equipment.26 This last point has importance in UDI people, since it is recognized needle-sharing practice for drug use in prison6. Harm reduction services can be provided safely without compromising the strategies to reduce drug use, assisting especially those who are not ready to stop using drugs.25 The delivery of sterile material also contribute on the issue of sharing material to make tattoos.

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Health education is shown to be necessary when enabling new practices and attitudes, both in the prison population, as the professionals working in prisons. The study showed little knowledge of administrative officers and staff of a prison the risks associated factors and mechanisms of transmission of hepatitis B infection14. A study carried out in Minas Gerais showed the same lack of knowledge about the transmission of STDs mechanisms between prisoners.23

More comprehensive strategies are needed to control the spread of infection, such as the establishment of transitional programs to improve the lives of post-discharge prisoners and ensure continuity of care in the community.19

It is believed that in order to strengthen and enhance prevention strategies already mentioned, the previous knowledge of the HIV status of the prison population is critical, and the solution creating periodic tests associated with health education and specific protection are needed. Similar measures have been adopted for prevention program in a prison: systematic testing in the admission of all detainees, provide accurate information on infection by HBV and HCV, ensuring vaccination against HBV and treatment. The program has given good results.15

CONCLUSION

The existence of factors associated with communicable diseases, especially to Hepatitis B related to incarceration within the prison units are concerned, since evidence that organizational changes and practices in imprisonment institutions are needed to combat the spread of disease in the population. Advanced age, low education, injecting drug use, have tattoo, unprotected sex and needle sharing have been associated with that infection in various continents, stressing that the problem is worldwide.

In summary, it was possible observed that, regardless of the country´s conditions and structure of the prison system, the prevalence of HBV is higher in the prison population, requiring the institution of preventive programs with incentives, in particular to vaccination, health education and strategy for harm reduction among IDUs.

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Corresponding Address
Andréia Alves de Sena Silva
Rua professor José de Sena, 3340
Bairro Parque Jurema
CEP 64076-430 – Teresina (PI), Brazil