

REVIEW

Understanding correlates of hepatitis B virus vaccination in men who have sex with men: what have we learned?

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Sex Transm Infect 2002;**78**:374–377

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Accepted for publication 5 July 2002

Objectives: Hepatitis B infection (HBV) is prevalent among men who have sex with men (MSM) and may lead to significant morbidity and death. Although an effective vaccine exists vaccination rates among MSM are low. We conducted a systematic review to synthesise the various findings from empirical correlational studies to understand HBV vaccination and series completion among MSM.

Methods: We systematically searched the Medline, PubMed, EMBASE, CINAHL, ERIC, and Web of Science databases to identify the breadth of published studies pertaining to HBV vaccination among MSM and to synthesise findings from these studies to better identify common themes that may direct future research and intervention approaches.

Results: Eight papers specifically addressed correlates of HBV vaccination among MSM. Six domains were identified as predictors of vaccination: (1) demographic variables such as younger age and higher education level; (2) knowledge of the vaccine; (3) access to health care; (4) level of "outness" regarding one's same sex sexual orientation; (5) behavioural factors including sexual and drug use behaviour; and (6) psychosocial variables. Three papers addressed predictors of vaccine series completion among MSM, observing two main domains: (1) demographic variables such as younger age and higher income level; and, (2) behavioural factors including sexual and health promotion behaviours.

Conclusions: Continued educational efforts, creation of environments that facilitate proper risk factor evaluation, and access to low cost vaccine may facilitate vaccine uptake. Although we observed important trends in the studies we reviewed, there is a lack of empirical research regarding this important public health issue.

Hepatitis B virus (HBV) infection remains one of the most important public health issues facing men who have sex with men (MSM),^{1–5} and MSM comprise a significant proportion of new HBV infections.^{6–7} Population based studies specifically examining HBV infection in MSM have consistently shown high levels of serological markers indicative of past or persistent HBV infection.^{8–10}

Since 1982, an effective, three dose vaccine against HBV has been available. Yet two decades after introduction of the HBV vaccine, studies continue to show that vaccination rates are low among MSM.^{8–10,14} Unfortunately little is known about why some MSM obtain the vaccine and others do not,¹⁵ and why some men who start the vaccine series complete it, and others do not.¹⁶

We synthesised the published research literature to identify common findings, themes, and trends related to HBV vaccination uptake and vaccine series completion among MSM in order to better inform vaccination programmes targeting this population. Based on our review, we also identified research gaps and needs.

METHODS

We conducted a systematic review of English language publications pertaining to hepatitis B vaccination using the Medline and Web of Science databases, 1966 through May 2002, and ERIC, CINAHL, PubMed, and EMBASE, 1980 through February 2002, to identify research papers related to HBV vaccination among MSM. A systematic series of keyword and subject searches were conducted, firstly, to identify articles concerning hepatitis B vaccination and then to identify articles concerning men who engage in same sex sexual behaviour, including self identified and non-self identified homosexual men. Subsequently, combinations of the

two search results were used to identify papers specifically addressing correlates of HBV vaccination in MSM. In addition, citations from the bibliographies of these articles were analysed and relevant citations were selected for review as well. We restricted our review to adult MSM.

RESULTS

Correlates of vaccination

Our literature search yielded eight papers directly addressing correlates of HBV vaccination among MSM. Seven of the papers reported multivariable correlations,^{2,11,17–21} and one paper reported univariable correlations exclusively.²²

To summarise, six domains associated with HBV vaccination were identified in the current HBV vaccination literature (table 1). The first domain included demographic variables that have been reported to be predictive of HBV vaccination, including younger age;^{11,19} school attendance or higher level of education;^{11,17,22} living in an urban setting;² and professional medical training.¹⁹

The next domain included participant knowledge of HBV and of the vaccine. Knowledge was associated with vaccination in three separate studies.^{18,19,22}

Access to health care was identified as the third domain associated with vaccination in two studies through two measures, including having a regular source of health care, and having health insurance.^{11,22}

Openness or the level of "outness" about one's same sex sexual orientation and one's risk behaviours with healthcare providers and others was the fourth domain identified to be associated with vaccination.^{2,11,19}

The fifth domain was characterised by behavioural correlates of vaccination. These included homosexual behaviour,²⁰ health promotion behaviours such as condom use,¹⁸ limited

Table 1 Summary of statistically significant ($p < 0.05$) correlates of HBV vaccination among MSM. Part A lists factors positively correlated with vaccination, while part B lists factors negatively correlated with vaccination

	References
A Positive correlates	
Demographic variables	
Younger age	11, 19
Education (currently attending school or having a higher level of education)	11, 17, 22
Living in an urban setting	2
Professional (health related) training	19
Vaccine knowledge	
Knowledge of HBV vaccine	18, 19, 22
Access to health care	
Having regular source of health care	22, 11
Having health insurance	22, 11
Sexual orientation	
Openness ("outness") about one's same sex sexual orientation with healthcare providers	19, 2
Openness ("outness") about one's same sex sexual orientation in general	11
Behavioural correlates	
Homosexual (versus heterosexual) behaviour	20
Health promotion behaviours (ie, condom use)	18
Limited number of lifetime sexual partners	2
Never having injected drugs	2
HIV or HBV testing	11, 17
Psychosocial correlates	
Attitude towards vaccination	21
Social norms surrounding vaccination	21
Perceived vulnerability to HBV infection	21
B Negative correlates	
Behavioural correlates	
≥20 lifetime sexual partners	2
Injection drug use	2
Psychosocial correlates	
Perceived high cost of the vaccine	22
Perception of being "low risk" for HBV	22

numbers of lifetime sexual partners,² never having injected drugs,² testing for HIV,¹¹ and having had sex in a bathhouse within the past 6 months.²

The psychosocial correlates of HBV vaccination were explored in one study and comprise the sixth and final domain identified to explain HBV vaccination among MSM.²¹ Although not measuring correlates of vaccination directly, this study found three psychosocial variables to predict intention to be vaccinated, including attitude towards vaccination; social norms surrounding vaccination; and perceived vulnerability to HBV infection.

Correlates of vaccine series completion

Three papers were identified that explored correlates of vaccine series completion among MSM. Two domains associated with HBV vaccine series completion were identified based on the current review (table 2). The first domain included demographic variables that have been reported to be

Table 2 Summary of statistically significant ($p < 0.05$) positive correlates of HBV vaccine series completion among MSM

Correlates	References
Demographic	
Older age	23
Higher income	2
Behavioural	
MSM behaviour	20
Health promotion	2
Sexual risk behaviours	2

predictive of HBV vaccine series completion including older age²³ and higher income.²

The second domain was characterised by behavioural correlates of vaccine series completion including MSM behaviour;²⁰ health promotion behaviours,² such as not exchanging sex for goods, services or drugs, and protected anal sex with regular partners during the previous 6 months; and sexual risk behaviours² such as higher numbers of lifetime partners, a history of STD infection, and alcohol use before engaging in sexual intercourse.

DISCUSSION

Our review suggests that several factors may be used to facilitate vaccine uptake in MSM populations. Firstly, the continuation of educational efforts, including social marketing campaigns promoting HBV vaccination among MSM, should be encouraged and new strategies further developed. Secondly, creating healthcare environments conducive to proper disclosure and assessment of an individual's risk for HBV should be fostered. Thirdly, access to low cost vaccine and, indirectly, access to medical care must be strengthened.

The observed correlations between increased knowledge of HBV infection and vaccination in several studies^{18 19 22} may reflect the success of educational and social marketing campaigns targeting this risk group.²⁴ The association that MSM were more likely to start the vaccine series than heterosexuals may reflect this assumption.²⁰ Similarly, the higher reported vaccination rates in younger MSM,^{11 19} as well as those with more education,¹¹ probably reflect enhanced efforts in some countries such as the United States to educate younger populations and provide vaccine for adolescents including young MSM.^{25 26}

However, it is evident that these messages have not reached all members of this community, as some studies showed that

up to 33% of MSM reported knowing nothing about HBV or HBV vaccination^{18 19 22}; thus, an added emphasis on innovative educational efforts may be necessary to raise the awareness of HBV and HBV vaccination in broader demographic groups, with more subgroups of the MSM community specifically targeted during campaigns—for example, older MSM who are less likely to be vaccinated.^{11 19} The creative use of innovative messages and channels for message delivery must be explored. Although peer education through lay health adviser networks within the MSM community has proved to be an effective method to reach MSM for HIV prevention,²⁷ this has not been tested empirically for the promotion of hepatitis B vaccination.

Secondly, our review also highlights the importance of communication between healthcare providers and their patients about risk for HBV infection. In particular, open communication about sexual orientation may play an important part in promoting vaccination of some MSM.^{2 11 19} Healthcare providers have an important role in facilitating vaccination and creating an environment in which open communication about risk can occur. Studies have shown in other populations that recommendation by a healthcare provider is a strong predictor of preventive behaviour.^{28 29} Thus, healthcare providers may have the potential to positively impact HBV vaccination among MSM in both privately and publicly funded healthcare facilities.

Studies of HBV vaccination rates in sexually transmitted disease (STD) clinics suggest that HBV vaccination rates of clinic patients are low.^{13 30} Because individuals being treated for STD would be considered at high risk for HBV infection,¹ not vaccinating this group is indeed a missed opportunity to prevent disease. This approach of vaccinating high risk individuals as they present to health providers has been previously recommended and may be an effective way of targeting such individuals.^{31 32} Further research is needed to understand whether STD client patients are being offered HBV vaccination, and if they are being offered vaccination services, why some patients are choosing to remain unvaccinated.

Lastly, some individuals believe that HBV vaccine is financially costly and this perception may hinder their desire to seek vaccination; 29% of MSM in a Boston community health centre surveyed reported that they would like to be vaccinated against HBV but were deterred by the perceived high cost of the vaccination.²² Thus, offering the vaccine free or at reduced cost may increase vaccination rates. Even some healthcare providers cite cost as a major deterrent for vaccination.³³ However, even among individuals with health insurance, a lack of knowledge exists among some about whether their insurance covers the costs of HBV vaccination.¹² Simultaneously educating healthcare providers about proper insurance reimbursement practices may also help those countries where private insurance is an important healthcare factor. Thus, aggressively increasing general access to vaccination services through reduced cost, the use of offsite clinic vaccination services, and educating individuals about their insurance coverage may help improve vaccine uptake. For vaccinating individuals who are uninsured, access to free or low cost vaccinations will be a key factor.

Correlates of vaccine series completion

The understanding of correlates of vaccine series completion is less clear. In a study by Dufour, a strong correlation was found between failure to complete the series and high risk behaviours such as unprotected intercourse or the trading sex for drugs, goods, or services.² Low risk sexual behaviours as reflected in never having had an STD or fewer than 20 lifetime sexual partners, on the other hand, were correlated with series completion.² Possibly, MSM who trade sex for drugs have limited access to, or discontinuity of, care or simply opt to not seek care or follow through when multiple visits to a

Key messages

- Additional educational efforts to promote HBV vaccination must be encouraged
- Environments conducive to proper risk disclosure/assessment are needed
- Availability of low cost/free vaccines are important
- Additional empirical research is needed regarding this issue

healthcare provider are necessitated. Again, a combination of creative social marketing; improved provider skills in assessing and encouraging vaccination; and increased access to vaccination services through financial subsidy and untraditional off-site clinic vaccination sites may be necessary to reach these hard to reach, yet most vulnerable, individuals. Clearly, other factors affect vaccine series completion, and these should be further explored in future studies.

Concluding comments

We have attempted to highlight trends in the current research to better inform future HBV vaccination efforts among MSM and draw together results of several studies on an important public health topic for which a paucity of empirical information exists. We synthesised findings and highlighted possible commonalities and explanations among them. During the 1980s a wealth of research regarding the HBV vaccine was conducted. While most studies focused on the biological aspects such as vaccine immunogenicity, little focus was placed on identifying behavioural targets for improvement of vaccine uptake. Future studies should systematically and empirically evaluate the trends we have identified.

Vaccination behaviour is complex and requires a multilevel approach both when trying to understand and affect behaviour. In order to reach MSM, a social ecological approach may be an effective framework to use to increase vaccination against HBV among MSM.³⁴ The dynamic interplay among factors at the intrapersonal, interpersonal, institutional, community, and public policy levels requires multilevel intervention strategies. However, more research is needed to fully understand predictors of vaccination and vaccine completion within all levels.

A tremendous and fundamental gap in the HBV vaccination literature concerns the populations studied. In all of the papers that met our inclusion criteria, the populations studied were predominantly white. There is an urgent need for further studies to include other racial groups to better understand possible cultural differences in vaccine seeking knowledge, attitudes, beliefs, and behaviours, especially with respect to the fact that some racial/ethnic groups, such as black people and Asians in the United States, have a higher incidence and prevalence of HBV.³⁵⁻³⁷

After 20 years of vaccine availability, much is still unknown. Laboratory science has developed and provided an effective vaccine; behavioural science must now provide the strategies to increase vaccination rates, while public health must provide the infrastructure to create enduring positive influences on this important health issue.

ACKNOWLEDGEMENTS

Manuscript preparation was supported in part by the Community Health Scholars Program funded by the WK Kellogg Foundation (to SDR).

CONTRIBUTORS

LJY conceived the design of this project, conducted reviews, summarised the data and contributed to the drafting of the manuscript; SDR helped refine the design of this project, conducted reviews, summarised the data, and contributed to the writing of the manuscript.

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