



CODEN [USA]: IAJPBB

ISSN : 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**

SJIF Impact Factor: 7.187

<http://doi.org/10.5281/zenodo.4154746>Available online at: <http://www.iajps.com>

Research Article

**FREQUENCY OF HEPATITIS B IMMUNIZATION GIVEN TO
INFANTS BORN TO HEPATITIS B INFECTED MOTHERS**¹Dr Sara, ²Dr Qindeel Hira Qureshi, ³Dr Aqsa Amin¹Pak International Medical College Peshawar.²Women Medical Officer, THQ Hospital, Kot Addu.³Shalamar Medical and Dental College, Lahore**Article Received:** August 2020**Accepted:** September 2020**Published:** October 2020**Abstract:**

Background: Globally the rate of chronic infection of Hepatitis B ranges from 0.1% to 20%¹⁻³. The prevalence of Hepatitis B worldwide is divided into three categories, i.e. High (>8%), Intermediate (2%-7%), Low (<2%). In Pakistan, only 54% of the eligible children have received all the three doses of hepatitis B vaccine⁹.

Aim: To know the frequency of Hepatitis B vaccination given to infants at birth born to Hepatitis B positive mother in year 2019.

Materials and Method: We conducted our study in three hospitals of Lahore; both public and private i.e. Amna medical Centre, Mayo Hospital and Jinnah Hospital. The subject of our study was infant born to hepatitis B positive mother. The study design was retrospective cohort in which we have compared the public and private hospitals of Lahore. We checked all the record for one year from January 2019 to December 2019. A total number of 7,842 patients record was checked which 112 pregnant women were found hepatitis B positive. All the data was entered in excel sheet. Mean and standard deviation were calculated. Bar graphs were designed for results.

Results: A total number of 7,842 files of pregnant women were checked in three hospitals of Lahore. Out of which 46 (2.5%) were found Hepatitis B positive. 2 (4.3%) infants were screened for Hepatitis B. 38 (82.6%) infants received Hepatitis B vaccine including 30 (65.2%) infants received both Hepatitis B vaccine and immunoglobulin's while 8 (17.3%) infants didn't received any vaccination.

Conclusion: The situation indicates a strong need of implementing hepatitis B vaccination dose at birth and changing the overall immunization mechanism.

Keywords: preventable disease, chronic infection, immunization mechanism, immunoglobulin.

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Please cite this article in press Sara et al, *Frequency Of Hepatitis B Immunization Given To Infants Born To Hepatitis B Infected Mothers.*, Indo Am. J. P. Sci, 2020; 07(10).

INTRODUCTION:

Hepatitis B is a vaccine preventable disease 1, 2. Globally the rate of chronic infection of, Hepatitis B ranges from 0.1% to 20%¹⁻³. The prevalence of Hepatitis B worldwide is divided into three categories, i.e.

High (>8%), Intermediate (2%-7%), Low (<2%)^{4, 5}.

Taking into consideration Hepatitis B 'e' antigen (HBeAg) prevalence as a major indicator of mother-to-child-transmission (MTCT). The highest rates were detected among young females from East Asia like China, where the perinatal transmission is the most common route of infection and the lowest in Sub-Saharan African, where horizontal transmission is predominant mode of transmission.^{6, 7}

The risk of development to chronic infection is inversely related to the age at getting hold of infection among the newly infected; approximately 90% of perinatal infections, 25%-50% of infections amongst toddlers and about 5% of adult life infections become chronic carriers of the virus.^{4, 6, 8}

In Pakistan, only 54% of the eligible children have received all the three doses of hepatitis B vaccine ⁹. The National Prevalence Study of Pakistan showed hepatitis B surface antigen (HBs Ag) positively to be 2.5% with wide variations seen within the provinces and districts ¹⁰. The prevalence of HBs Ag in children under 5 years was 1.3%.^{10, 12}.

The MTCT risk is related to HBe Ag positivity of the mother, where a mother who is HBe Ag positive has a 90% chance of transmitting this disease to her baby^{13, 14}. Globally hepatitis B vaccine has been included in the Expanded Programme on Immunization (EPI) to protect all newborns irrespective of mother's HBV status.

Hepatitis B vaccine was first included in Pakistan's EPI in 2001 as a tetravalent vaccine (with DPT) and later replaced with the pentavalent vaccine (DPT, HBV, HIB) given at 6, 10 and 14 weeks without a birth dose while internationally hepatitis B vaccine and immunoglobulin's are given at birth.

The hepatitis B prevalence data is showing a 1.3% prevalence of HBs Ag in children < 5 years of age ¹². and is pointing towards a possibility of vertical transmission as most of these children were vaccinated through EPI at around 6 weeks without a birth dose of HBV vaccine.

The present study targeted infants residing in public and private hospitals of Lahore if either the infants are vaccinated at birth or not. This study also includes the comparison between the public and private hospitals of Lahore.

LITERATURE REVIEW:

A study was conducted in three provinces of Pakistan namely Baluchistan, Sindh, Punjab and their respective districts (two districts with highest prevalence were selected between May 2010 and February 2011). The study was descriptive analytical to find the hepatitis B transmission occurring in infants born to HBsAg positive mothers. Total 1561 mothers and their 1612 children tested. Among the mothers 590 (37.8%) were hepatitis antibody positive. Remaining 971 (62.2%) samples were tested for surface antigen and 123 (12.7%) were found positive of which 27 (22%) showed HBeAg positivity. Out of 1612 children tested 975 (60.5%) were positive. Remaining 637 (39.5%) were tested for surface antigen and 49 (8%) were found positive of which 24 (49%) with HBeAg positive. Hepatitis vaccination record showed that 1229 (76.25%) were vaccinated at 6 weeks with pentavalent vaccine but despite vaccination 33 (2.6%) became surface antigen positive ¹¹. Moreover, the vaccinated and unvaccinated children born to surface antigen positive mother were 9 and 11 times respectively more likely to be exposed to the risk of hepatitis B virus transmission relative to vaccinated children born to surface antigen negative mother.

Rationale of the Study:

Hepatitis B vaccination given at 6, 10, 14 weeks of birth is not significantly protective, indicating a strong need for the introduction of birth dose into the immunization system.

Objectives:

1. To know the frequency of Hepatitis B vaccination given to infants at birth born to Hepatitis B positive mother in year 2016.
2. To know the frequency of Hepatitis B vaccination and immunoglobulin's given to infants at birth born to Hepatitis B positive mother in year 2016.
3. To compare public and private sector hospitals either they vaccinate Infants born to Hepatitis B mother at birth or not.

METHODOLOGY:

We conducted our study in three hospitals of Lahore, both public and private i.e. Ammar Medical Complex, Mayo Hospital and Jinnah Hospital.

Study population:

The subject of our study was infant born to hepatitis B positive mother.

Study design:

The study design was retrospective cohort in which we have compared the public and private hospitals of Lahore as mentioned above.

Sampling:

We checked all the record from January 2016 to December 2016. A total number of 7,842 patients record was checked in which 112 pregnant women were found hepatitis B positive.

Ethical Consideration:

Written consent was taken from hospital administration.

Data Analysis:

All the data was entered in excel sheath. Mean and standard deviation were calculated. Bar graphs were designed for results.

RESULTS:

A total number of 7,842 files of pregnant women were checked in three hospitals of Lahore; Ammar Medical Complex, Mayo Hospital and Jinnah Hospital. Out of which 112 (1.42%) pregnant women were found Hepatitis B positive.(TABLE 1.1)

TABLE 1.1: Overall statistics of three hospitals

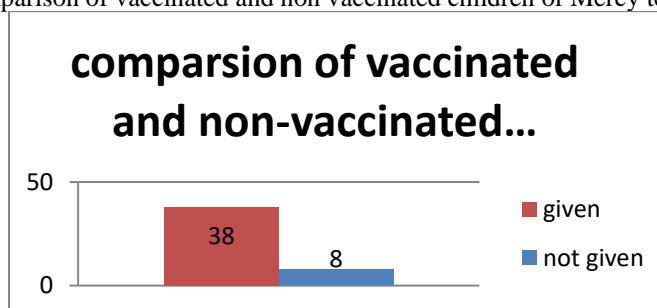
Pregnant women presented to Ammar Medical Complex	Pregnant women presented to Mayo Hospital	Pregnant women presented to Jinnah Hospital	Total
1800	2793	3249	7842
Hepatitis B positive pregnant women	Hepatitis B positive pregnant women	Hepatitis B positive pregnant women	Total
46(2.5%)	25(0.89%)	41(1.26%)	112(1.4%)

In Ammar Medical Complex, a total number of 1800 pregnant women were presented in year 2016. Out of which 46 (2.5%) were found Hepatitis B positive. 2 (4.3%) infants were screened for Hepatitis B. 38 (82.6%) infants received Hepatitis B vaccine including 30 (65.2%) infants received both Hepatitis B vaccine and immunoglobulin's while 8 (17.3%) infants didn't received any vaccination.(TABLE 1.2)

Table 1.2: Statistics of Mercy Teaching Hospital

1. No. of pregnant women	Hepatitis B positive	Non Hepatitis B positive
1800	46(2.5%)	1754(97.4%)
2. Total no. of infants	Screened for Hepatitis B	Not screened for Hepatitis B
46(2.5%)	2(4.3%)	44(95.6%)
3. Hepatitis B vaccine received	Both Hepatitis B vaccine and immunoglobulin's received	Not received any vaccination
38(82.6%)	30(65.2%)	8(17.3%)

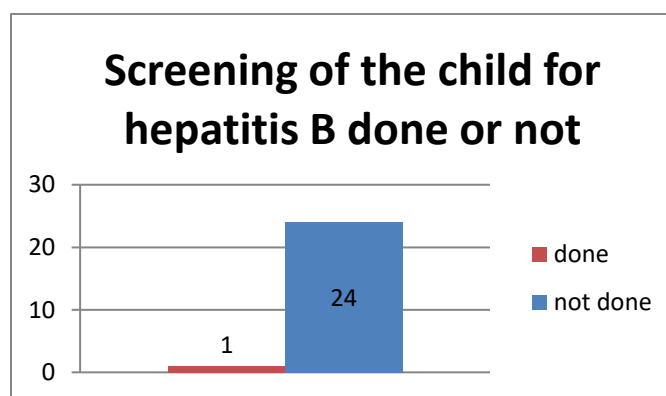
Figure 1: comparison of vaccinated and non vaccinated children of Mercy teaching hospital



In Mayo Hospital, a total number of 2793 pregnant women were presented in year 2016. Out of which 25 (0.89%) were found Hepatitis B positive. 1 (4%) infants were screened for Hepatitis B. 4 (16%) infants received Hepatitis B vaccine including 3 (12%) infants received both Hepatitis B vaccine and immunoglobulin's while 21 (84%) infants didn't received any vaccination.(TABLE 1.3)

1. No. of pregnant women	Hepatitis B positive	Non Hepatitis B positive
2793	25(0.89%)	2768(99.1%)
2. Total no. of infants	Screened for Hepatitis B	Not screened for Hepatitis B
25(0.89%)	1(4%)	24(96%)
3. Hepatitis B vaccine received	Both Hepatitis B vaccine and immunoglobulin's received	Not received any vaccination
4(16%)	3(12%)	21(84%)

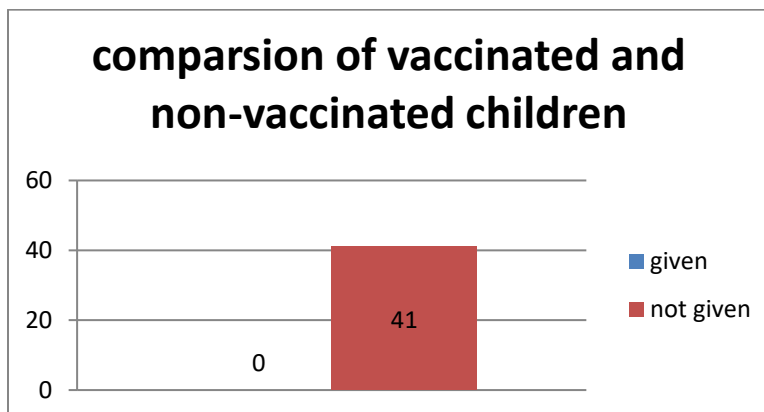
Figure 2: comparison of vaccinated and non-vaccinated children of Mayo hospital



In Jinnah Hospital, a total number of 3249 pregnant women were presented in year 2016. Out of which 41 (1.26%) were found Hepatitis B positive. Neither of the infant were screened for hepatitis B nor vaccinated. (TABLE 1.4)

1. No. of pregnant women	Hepatitis B positive	Non Hepatitis B positive
3249	41(1.26%)	3208(98.7%)
2. Total no. of infants	Screened for Hepatitis B	Not screened for Hepatitis B
41(1.26%)	0(0%)	0(0%)
3. Hepatitis B vaccine received	Both Hepatitis B vaccine and immunoglobulin's received	Not received any vaccination
0(0%)	0(0%)	0(0%)

Figure 3: comparison of vaccinated and non-vaccinated children of Jinnah Hospital



DISCUSSION:

We conducted our study in three hospitals of Lahore including both public and private. The major objective of our study was to know the frequency of Hepatitis B vaccination and immunoglobulin's given to infants at birth. Furthermore we also included the comparison between the public and private hospitals. The comparison shows that the private sector is playing a more responsible role than the public sector as it is providing hepatitis B vaccination and immunoglobulin's to the infants within 24hr of birth as there is no such policy or strategy present in the public sector (HMC). The study also shows that as private sector is doing well compared to public sector but it also needs much more improvement as there are some loop holes which have to be taken in consideration. The main reason for this is; carelessness of hospital administration and lack of awareness among the patients.

The most important objective of hepatitis B immunization is the prevention of hepatitis B, which can be achieved by routine infant vaccination and prevention of perinatal HBV transmission 1. In 1992, the World Health Assembly (WHA) passed resolution (45.17) that called member states for the integration of hepatitis B vaccine into the National Immunization Programme by 1995 for countries with HBsAg prevalence of 8% or more, and by 1997 for all other countries, irrespective of their level of HBV endemicity. It was subsequently reaffirmed by the resolution WHA63.13. [19-20]

According to the crude birth rate reflected by the 2010 Pakistan report, issued by the Ministry of Population Welfare, approximately 4.85 million children are born in the country each year²¹. Considering the nationwide prevalence of HBV infection estimated at 2.5% among pregnant women, with a similar reported countrywide overall

prevalence rate of HBsAg, about 121,000 expecting mothers are anticipated being HBsAg positive every year.^{10,12,22} The latter confirms the fundamentals of advancing the necessary control strategies that include introducing the hepatitis B vaccine birth dose as an vital component and basic measure of the national EPI to prevent MTCT, eliminate the prevailing high rate of HBV chronic infection among infants and young children and reduce the high burden of chronic liver disease in the country. [17]

To prevent this high burden of HBV infection, government should consider the revision of the national hepatitis B vaccination policy with the major public health imperative of rapidly preparing for the free birth dose of hepatitis B vaccine.

Screening for maternal HBsAg and a birth dose for children born to HBsAg positive mothers with the addition of hepatitis B immunoglobulin (HBIG) within 24h of birth was considered to be the most effective way to prevent HBV infection.^{6, 18, 23}. Moreover, HBV infection cannot be viably prevented by identifying infants born to HBsAg positive mothers and giving them a birth dose of hepatitis B vaccine or by screening pregnant women for HBsAg as many children still get infected with the virus despite their mother being HBsAg negative. [15-16,24]

Hepatitis B viral infection is endemic in Pakistan and the risk of perinatal transmission cannot be ignored as it leads to high rates of chronic HBV infection and complications of chronic liver disease. In view of the corroborated significant MTCT in Pakistan, the health sector has to introduce a universal and timely coverage with hepatitis B birth dose vaccination administered soon after birth and within the first 24 hours. This proposal was recommended in 2010 by the World Health Organization (WHO) Eastern

Mediterranean Regional Committee to its member states including Pakistan. [25]

The government has to promote coordination and collaboration in the fight against vaccine preventable diseases. Serious efforts are also required to reengage local communities and families in the planning, implementation, surveillance and monitoring of the EPI services for ensuring full coverage and timely administration of the hepatitis B vaccine birth dose. With these combined efforts the vertical transmission of hepatitis B virus infection will effectively be controlled and the goal towards the elimination of HBV infection shall be made possible.

CONCLUSION:

Hepatitis B vaccination at 6, 10 and 14 weeks of birth is not significantly protective. The situation indicates a strong need of implementing hepatitis B vaccination dose at birth and changing the overall immunization mechanism. Both public and private hospitals are needed to be improved in this regards. Comparatively private sector is better but still improvements are required. Specifically the public sector is far lacking behind and there should be proper monitoring. Furthermore different campaigns should be launched for the awareness of the public.

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