Original article

Knowledge, Attitude and Practices of Hepatitis B among Family Members of Hepatitis B Cases in District Dera Ghazi Khan of Punjab, Pakistan: A Community-Based Study

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ABSTRACT

Background: Hepatitis B virus (HBV) is a major global health concern, potentially leading to complications like cirrhosis and liver cancer. This study evaluated knowledge, attitudes, and practices regarding HBV among family members of HBV-positive patients in a rural area.

Methods: A descriptive cross-sectional study was conducted from January to August 2021 in Union Council Choti Zareen, District Dera Ghazi Khan, Punjab, Pakistan. The study targeted 200 immediate family members of Hepatitis B-positive cases, excluding those residing outside the study area, non-family caregivers, and critically ill individuals. Data was collected through face-to-face interviews. Categorical variables were presented as percentages, while continuous variables were reported as means and standard deviations. Associations were analyzed using the Chi-square test, with significance set at $p \leq 0.05$.

Results: Knowledge of HBV was universal (100%), with 190 (95%) acquiring information from health personnel. Regarding transmission modes, 172 (86%) had knowledge, with unsafe injections (73, 36.5%) being the most recognized route. Preventive measures were known by 172 (86%). Preventive practices were limited with only 38 (19%) requesting sterilized instruments and 6 (3%) observing safe sexual practices. Knowledge of HBV transmission and prevention was significantly associated with age ($p = 0.02$, $p = 0.015$), gender ($p = 0.0395$), education ($p = 0.00$), and LHW visits ($p = 0.00$, $p = 0.03$).

Conclusion: Strengthening health education and enhancing LHW outreach in rural areas is essential to improve HBV knowledge and preventive practices, reducing morbidity and mortality

Keywords:

Hepatitis B, Knowledge, Attitudes, Health Practices, Rural Population, Pakistan.

INTRODUCTION

Hepatitis B is a life-threatening disease caused by Hepatitis B Virus (HBV) which mainly affects the liver and can lead to serious complications like cirrhosis, acute liver failure and hepatocellular cancer. People living with hepatitis B, may not be clinically ill or even unaware, can still transmit HBV infection to others, hence called a silent killer [1, 2]. An estimated 820,000 deaths per year worldwide can be attributed to it [1]. In the Eastern Mediterranean region, about 21 million people have chronic Hepatitis B and Pakistan is one of its main contributors [3]. Estimates from various research studies in different subgroups of the population show the prevalence rates of people infected with HBV in Pakistan ranging from 2-10% [4-6], with striking variations in the prevalence of Hepatitis B between urban and rural areas, and also among blood donors and non-blood donors. Currently, three modes of transmission have been recognized which include perinatal, sexual and parenteral/percutaneous transmission [7].

The most effective way of preventing HBV infection is with HBV vaccine. Although improved vaccination coverage in the past decade has decreased the prevalence of this disease in the developed world [8], the same cannot be said for Pakistan. Reasons for the consistently high number of cases are the increasing cost of antiviral medicines, deficiency in knowledge of general public regarding HBV infection, vaccine hesitancy, lack of screening in high-risk populations, lack of strategic

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information and motivation in the health sector to address the challenge.[3, 9, 10]

Variation in the prevalence of HBV infection has been observed in different regions of Pakistan. In urban areas like Karachi, HBV prevalence is about 2-5% which is much lower in comparison to the rural areas where up to 30-35% of prevalence has been observed. Therefore Pakistan is considered under the Intermediate Risk region concerning HBV by the World Health Organization (WHO).[11]

Assessing knowledge levels in the population for diseases like HBV helps in the effective establishment of preventive strategies and management approaches. Multiple studies show a deficiency in knowledge of the general population regarding HBV particularly with respect to the modes of spread of HBV infection and its complications like hepatocellular carcinoma and liver cirrhosis.[12, 13]

There was an urgent need to carry out the HBV survey which will help in the planning and implementation of HBV prevention. The current research was designed to evaluate the knowledge of HBV, its etiology, and associated risk factors as well as to analyze the attitude towards the preventive practices of HBV in the target population. This article states the findings of the survey conducted in the catchment area of Union Council (UC) Choti Zerin, District Dera Ghazi Khan, and revealed reliable national data about the increased prevalence of HBV. Also, it will develop the basis for establishing national control interventions in the future.

SUBJECTS AND METHODS

This descriptive cross-sectional community-based study was carried out principally to explore the current status of knowledge about Hepatitis B and its preventive measures observed by families of Hepatitis B-positive cases in the catchment area of Choti Zareen which is a union council of District Dera Ghazi Khan and is located in the southern part of Punjab near KPK border. It is a predominantly rural area where more than 50% of the population lives below the poverty line [14].

The inclusion criteria of the study were the immediate family members, including parents, siblings, spouses, and children of Hepatitis B-positive cases (confirmed through ELISA or screening) residing in Union Council Choti Zerin. Whereas family members residing outside UC Choti Zerin, non-family members such as caregivers, and critically ill individuals were excluded to maintain the study's localized focus and ensure reliable participation.

Calculated sample size was 200 which was measured with the help of the computer program EPI Info [15] using the following formula:

$$N = \frac{Z^2\ 1-x/s\ P(1-P)}{d^2}$$

Where

N = Sample size

Z = statistically certainty chosen

P = anticipated population portion

d = absolute precision level

1-x= 95%

A simple Random sampling technique was applied. A list with all Hepatitis B-positive cases residing in the UC Choti Zerin was obtained from the rural health center and general practitioners which served the purpose of a sampling frame of which 200 cases were selected randomly for the study.

Data was collected from January to August 2021 after approval from the Ethical Review Committee of People's University of Medical and Health Sciences for Women, Sindh. The researchers themselves visited the selected Hepatitis B-positive cases and requested the family members to contribute to the study. The family member (respondent) was preferably the spouse for the married patient if not available then an unmarried close blood relative if not available then a close family relative was included in the study. After taking the consent and explaining the purpose the respondent was assessed by the questionnaire. The questionnaire was carried out face to face and participants were assessed about their knowledge and attitude towards HBV. The questionnaire was designed according to the literature review [4, 16] and was divided in three major sections consisting of the sociodemographic profile of participants, the knowledge or awareness of HBV, and the attitude towards preventive measures of HBV. The questionnaire was translated to Punjabi and Saraiki for better communication with respondents. Data was collected via face-to-face interviews and participants were assessed about their knowledge and attitude towards HBV.

The questionnaire had 3 sections. This first section included data about socio-demographic characteristics of participants like age, gender, marital status, education status, occupation and family income. It also included some significant background information like relationship with HBV cases, distance to the nearest health facility and lady health worker availability in the area. The second section was designed to evaluate knowledge among the participants regarding HBV diseases and its related health services being offered in the area. This included questions like mode of transmission and methods prevention of HBV. It also included questions about government allocated facilities for screening and the cost related to it. The third section evaluated the attitude and practices of participant towards the preventive measures of HBV like

the safety measure to prevent Hepatitis B and screening tests for HBV and vaccination and other personal practice questions like whether they were in the habit of asking for sterilized instruments, disposable syringes, safe disposal of used syringes during visit to health centers, barber shops and beauty salons.

Categorical variables, such as knowledge of Hepatitis B (adequate vs. inadequate), preventive measures practiced (e.g., vaccination or using personal hygiene items), relationship to the Hepatitis B-positive individual (parent, sibling, spouse), gender (male/female), and education level (primary, secondary, tertiary, or none), were measured as percentages, while continuous variables, such as age of family members (in years) and duration of exposure to the Hepatitis B-positive individual (in months/years), were measured as means and standard deviations; a Chi-square test was applied to evaluate the relationship between independent variables (e.g., gender, education level, and duration of exposure) and the main outcomes, with a p-value of ≤ .05 set as the level of significance.

RESULTS

A total of 200 questionnaires were completed from the respondents who were willing to participate in the current survey. Out of 200, majority of the participants were male n=108 (54%). Most respondents n=150 (75%) were at the age of 40 years or below with mean age of the respondents were 34. Out of 200, n=104 (52%) of the respondents were literate with n=104 (97%) were employed. The details of socio-demographic characteristics of the respondents are shown in Table 1.

In response to question about the availability of LHW and their visit, it was found that 30 (15%) families have no LHWs posted in their areas while 170 (85%) have LHWs posted in their area but among those which have LHWs posted in their areas, 18 (10.6%) were such who were not visited by any LHW. So, approximately 48 (24%) out of 200 families were deprived of visits of LHWs.

All the respondents knew HBV and among them, 190 (95%) got this information from the health personnel and the remaining 10 (5%) from their relatives and friends. When the participants were asked about the mode of spread of HBV, 73 (36.5%) of the participants told that HBV spread through unsafe injection practices followed by 40 (20%) of participants who told HBV spread through unprotected sex respectively (Figure 1).

Among 200 participants it was found that 172 (86%) have the knowledge about the prevention from HBV while 28 (14%) didn't have any idea about its preventive measures. However among 172 respondents, 96 (55.8%) have mentioned immunization followed by blood screening 40 (23.25) and disposable syringes 36(20.9%) respectively.

Table 1: Frequency distribution of respondents according to socio demographic profile n=200

Characteristics	Frequency	Percentage
Age		
40 years or below	150	75%
Above 40 years	50	25%
Mean ± SD	34 ± 10.7	
Gender		
Male	108	54%
Female	92	46%
Marital status		
Married	182	91%
Single	18	9%
Type of family		
Nuclear	20	10%
Extended	180	90%
Educational status		
Illiterate	96	48%
Literate	104	52%
Occupation		
Employed	194	97%
Unemployed	6	3%
Total No. of family members		
≤10	114	57%
≥10	86	43%
Distance of nearest health facility		
5km and less	188	94%
> 5km	12	6%
Distance of the Govt. health facility		
5km and less	176	88%
>5km	24	12%

Table 2: Practices of Respondents regarding HBV n=200

Safety Measures	Yes (%)	No (%)
Sterilized instruments requested	38 (19)	162 (81)
Disposable syringes requested	96 (48)	104 (52)
Safe disposal of syringes requested	26 (13)	174 (87)
Blood screening	26 (13)	174 (87)
Separate razor requested from barber	64 (32)	136 (68)
Safe sexual practices observed	6 (3.3)	176 (96.7)

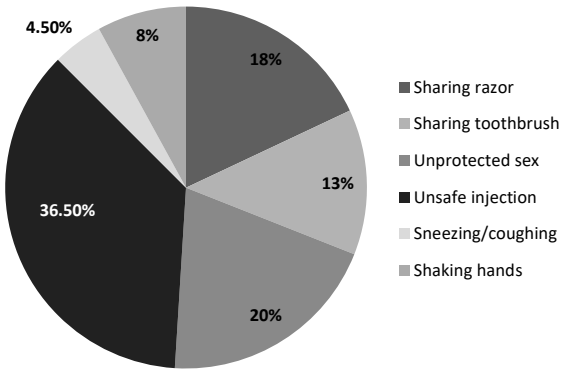

Figure 1: Knowledge of respondents about HBV & its mode of spread

When inquired about the relationship of respondent with the patients it was found that 102 (51%) were the spouse while 64 (32%) were blood relatives including parents and children while 34 (17%) were cousins or sister/brother in laws etc. Furthermore, it was found that 88 (44%) of the patients were diagnosed during the last year where as in 112 (56%), the time since diagnosis was more than 1 year. Also the screening of majority of these patients 190 (95%) were done in private hospitals with only 10 (5%) in the Government institutions.

Regarding screening it was seen that only 70 (35%) have screening for HBV while majority 130 (65%) did not have. Moreover it was observed that only 3% have got test available in nearest health facility. Also, 58 (29%) have got the knowledge about the health facility where this test is available while 142 (71%) did not know about it. Among the 70 respondents who had screening, 40 (57.1%) were screened within one year while 30 (42.95) got screening before 1 year. Furthermore, results of screening among 70 showed that 24 (34.3%) were positive while 46 (65.7%) were negative for HBV antigen. Among those 46 negative respondents, only 26 (13%) hot vaccinated against HBV infection whereas 20 (10%) didn't bother for it. It is important to mention here that out of those 26 who got vaccinated against HBV, only 2 (7.7%) have completed course of vaccination.

Regarding preventive practices during a visit to health facility by the respondent, it was found that 19% asked for sterilized instruments, 48% asked for disposable syringes and 13% said they asked for safe disposal of syringes and blood screening respectively (Table 2).

When the knowledge of the mode of spread of HBV is correlated with the age group, it was found that young group 40 or below 40 years of age had more knowledge compared to the older age group i.e. above 40 years and this was statistically significant (p=0.02). Likewise significant association was observed between age and knowledge of preventive measures (0p=0.015).

Moreover, when knowledge of spread of HBV was compared with gender, it was observed that male have more knowledge in comparison to females and it is statistically significant p=0.0395. Also, significant association was observed between knowledge of preventive measure and knowledge of spread with the education status (p=0.00).

It is important to mention that when the knowledge of preventive measures and mode of spread of compared with the visit of LHWs in their houses, a significant association was observed (p=0.00,p=0.03) revealing that those respondents whose houses were visited by LHWs had more knowledge in comparison to those respondents not having LHW visit.

DISCUSSION

HBV infection is a major public health problem with more than 2 billion people are affected with HBV infection worldwide and about 350 million had chronic lifelong infection [17]. An estimated 555 000 fatalities worldwide were attributed to HBV-related illnesses in 2019, which accounted for 48.8% of all hepatitis-related deaths [18]

Prevention is the only safeguard against the epidemic of viral hepatitis. Knowing the facts and having proper attitudes and behaviors are critical to preventing HBV infection. Hence this study was conducted to explore the knowledge and preventive practices about Hepatitis B in affected families of HBV infection-positive patients.

HBV infection is a preventable disease and its continued occurrence indicates the shortcomings of modern public health measures. Effective measures to prevent HBV include non-specific and specific ones. The most effective and most specific means of preventing HBV infection is with the HBV vaccine [19]. The scope of this study is to determine the level of knowledge of likely problems like HBV in the target population for the effective establishment and application of preventive strategies or management approaches.

The current study disclosed that correct knowledge of HBV is low among family members of Hepatitis B positive cases with 46% having correct knowledge of transmission and 47% having correct knowledge of prevention. Other studies from Pakistan in various sub-groups of the population also observed a similar trend [20, 21]. This is also in accordance with study carried out by Afsar and his colleagues stating that knowledge regarding sexually transmitted disease was very limited in rural community of Pakistan [22]. Similarly, the study carried out in India reported the similar finding with only 34% of the participants knew about the mode of transmission [23]. Our study also found a significant positive relationship between education and knowledge. 95% of the study participants claim that they got their information from a healthcare provider, but correct knowledge is still low. This could be because almost half of the respondents are illiterate and had difficulty in understanding basic concepts of transmission and prevention. This goes to show that more attention needs to be focused on the way this information is disseminated. The general public should be provided with this information in a way they can understand.

The overall attitude towards screening and vaccination was found to be negative in our study with only 13% willing to get screened for HBV and 13% overall getting their first vaccination dose. Similar results were observed by Noman-ul-haq in the general healthy population of Quetta [24] and even in some studies on barbers [4, 25] but studies by Nasim et al and Zara et al on

health professionals shows attitude of being interested in getting screening and vaccination [26, 27]. The current study also documented that most of the participants had poor preventive practices where only 19% cared for sterilized instruments during visits to health facility, 32% asked for a separate razor from the barber and only 3% observed safe sexual practices.

The study by Behzad et al on Hepatitis B knowledge and associated factors revealed a higher knowledge score was also t being linked with younger age (≥40 years vs. >40 years) (adjusted β: 9.24; 95%CI: -0.58, 19.05; p=0.06) which is in agreement with the current study findings stating that that young group 40 or below 40 years of age had more knowledge compared to the older age group i.e. above 40 years which was statistically significant (p=0.02) [28]. In the current study significant association was observed between knowledge of preventive measures and knowledge of spread with the education status (p=0.00, p=0.00) which is similar to the study of Australia stating that participants with higher levels of education were anticipated to know more about hepatitis B [28, 29].

Research studies have already proven that correct knowledge leads to positive attitudes and good preventive practices [30]. Poor knowledge in our study population has led to poor preventive practices which further exposes them and their family members to an increased risk of acquiring HBV infection. As the current study was a cross-sectional survey with a small sample size, the findings of the study cannot be generalized.

CONCLUSION

In conclusion, HBV infection is an emerging health problem globally and is a common infection in Pakistan. Awareness of the disease is necessary for the prevention and control of the disease. This study explored gaps in knowledge about Hepatitis B and preventive measures among the family members of Hepatitis B-positive cases. There is a need for health education awareness programs for the public, especially for high-risk populations about the mode of spread and preventive measures against Hepatitis B. If the affected families get proper education regarding Hepatitis B, transmission, and prevention, the prevalence of HBV along with the morbidity and mortality associated with liver cancer can be decreased.

Author Contributions

Aneequa Sajjad, Syeda Batool: Conception and design, analysis and interpretation of data, drafting the article, critical revision for important intellectual content, final approval.

Aneequa Sajjad, Syeda Batool: Conception and design, analysis and interpretation of data.

Zaira Sajjad, Syeda Batool: Analysis and interpretation of data, drafting the article.

Syed Sajjad Sarwar, Aneequa Sajjad: Acquisition of data, conception and design, analysis and interpretation.

Aneequa Sajjad, Syeda Batool: Analysis and interpretation of data, proofreading.

Mahnoor Fatima. Muhammad Qasim Raza: Conception and design, analysis and interpretation of data.

REFERENCES

1. Center of Disease Control. Fast Facts: Global Hepatitis B Vaccination 2024 [Available from: https://www.cdc.gov/global-hepatitis-b-vaccination/data-research/index.html#:~:text=Hepatitis%20B%20contributes%20to%20an%20estimated%20820%2C000%20deaths%20every%20year.
2. Alghamdi M, Alghamdi AS, Aljedai A, Khathlan AA, Masri NA, Qutub A, et al. Revealing Hepatitis B Virus as a Silent Killer: A Call-to-Action for Saudi Arabia. Cureus. 2021;13(5).
3. Fikri M. Eliminating hepatitis from the Eastern Mediterranean Region. Eastern Mediterranean Health Journal. 2017;23(7):459.
4. Jokhio A, Bhatti T, Memon M. Knowledge, attitudes and practices of barbers about hepatitis B and C transmission in Hyderabad, Pakistan. EMHJ-Eastern Mediterranean Health Journal, 16 (10), 1079-1084, 2010. 2010.
5. Naeem M, Malik A, Ali Q, Khalid M, Masud S, Bhutta AM. Hepatitis B and C prevalence and its associated risk factors among school going children in urban and rural areas of District Muzaffar Garh, Pakistan. Genetics and Molecular Research. 2020;19(1).
6. Mehmood S, Raza H, Abid F, Saeed N, Rehman HM, Javed S, et al. National prevalence rate of hepatitis B and C in Pakistan and its risk factors. Journal of Public Health. 2020;28(6):751-64.
7. Kevin H. Kim EMA. Hepatitis B Virus: U.S.Pharmacist; 2023 [Available from: https://www.uspharmacist.com/article/hepatitis-b-virus.
8. Al-Busafi SA, Alwassief A. Global Perspectives on the Hepatitis B Vaccination: Challenges, Achievements, and the Road to Elimination by 2030. Vaccines. 2024;12(3):288.
9. Asif AF. Appraisal of national response to chronic hepatitis in Pakistan. Journal of Islamabad Medical & Dental College. 2019;8(1):3-7.
10. Qazi U, Malik S, Raza UA, Saad M, Zeeshan MF, Anwar S. Compliance to timely vaccination in an Expanded Program on Immunization center of Pakistan. Vaccine. 2019;37(32):4618-22.
11. Qureshi H, Mahmood H, Sabry A, Hermez J. Barriers and Strategies for Hepatitis B and C Elimination in Pakistan. The Journal of Infectious Diseases. 2023;228(Supplement_3):S204-S10.
12. Mustafa RE, Mushtaq S, Akhtar N, Yameen MA. Assessment of knowledge, attitude and practice towards hepatitis among patients visiting the hepatitis clinic in tertiary care hospital, Rawalpindi, Pakistan. JPMA The Journal of the Pakistan Medical Association. 2019;69(8):1136-41.
13. Ali M, Idrees M, Ali L, Hussain A, Rehman IU, Saleem S, et al. Hepatitis B virus in Pakistan: a systematic review of prevalence, risk factors, awareness status and genotypes. Virology journal. 2011;8(1):1-9.
14. Naveed A, Khan SA. Widening disparities: public sector spending and poverty across districts in Punjab. 2019.
15. Andrew G. Dean Ec, and Roger A. Mir. Sample Size:X-Sectional, Cohort, & Randomized Clinical Trials 2015 [Available from: https://www.openepi.com/SampleSize/SSCohort.htm.
16. Mohamed R, Ng CJ, Tong WT, Abidin SZ, Wong LP, Low WY. Knowledge, attitudes and practices among people with chronic hepatitis B attending a hepatology clinic in Malaysia: a cross sectional study. BMC Public Health. 2012;12(1):1-14.
17. MacLachlan JH, Cowie BC. Hepatitis B virus epidemiology. Cold Spring Harbor perspectives in medicine. 2015;5(5):a021410.
18. Sheena BS, Hiebert L, Han H, Ippolito H, Abbasi-Kangevari M, Abbasi-Kangevari Z, et al. Global, regional, and national burden of hepatitis B, 1990–2019: a systematic analysis for the Global Burden

of Disease Study 2019. The lancet Gastroenterology & hepatology. 2022;7(9):796-829.
19. Chang M-H, Chen D-S. Prevention of hepatitis B. Cold Spring Harbor perspectives in medicine. 2015;5(3):a021493.
20. Noreen N, Kumar R, Shaikh B. Knowledge about hepatitis B vaccination among women of childbearing age: a cross-sectional study from a rural district of Punjab, Pakistan. East Mediterr Health J. 2015;21(2):129-33.
21. Maqsood S, Iqbal S, Zakar R, Zakar MZ, Fischer F. Determinants of Overall Knowledge and Health Behaviors Towards Hepatitis B and C Among Ever-Married Women in Pakistan: Evidence Based on Demographic and Health Survey 2017–18. 2020.
22. Afsar H, Mahmood M, Barney N, Ali S, Kadir M, Bilgrami M. Community knowledge, attitude and practices regarding sexually transmitted infections in a rural district of Pakistan. Journal of Pakistan Medical Association. 2002;52(1):21.
23. Yasobant S, Trivedi P, Saxena D, Puwar T, Vora K, Patel M. Knowledge of hepatitis B among healthy population: A community-based survey from two districts of Gujarat, India. Journal of family medicine and primary care. 2017;6(3):589.
24. ul Haq N, Hassali MA, Shafie AA, Saleem F, Farooqui M, Aljadhey H. A cross sectional assessment of knowledge, attitude and practice towards Hepatitis B among healthy population of Quetta, Pakistan. BMC Public Health. 2012;12(1):1-8.
25. Shah HBU, Dar MK, Jamil AA, Atif I, Ali RJ, Sandhu AS, et al. Knowledge, attitudes and practices of hepatitis B and C among barbers of urban and rural areas of Rawalpindi and Islamabad. Journal of Ayub Medical College Abbottabad. 2015;27(4):832-6.
26. Nasim A, Shah Y, ul Haq N, Tahir M, Mohammad F, Saood M, et al. Knowledge, Attitude and Practice Regarding Hepatitis B in Nurses Working in Different Hospitals of Quetta City, Pakistan. International Journal of Nursing Critical Care. 2020;6(1):24-34.
27. Zara B, Allah NUM, Javed W, Siddique S, Mahmood H, Hassan F. A cross-sectional assessment of knowledge, attitude, and practices toward hepatitis b virus infection among dentists of tertiary hospitals in islamabad, Pakistan. Pakistan Oral & Dental Journal. 2020;40(2):66-71.
28. Hajarizadeh B, Wallace J, Richmond J, Ngo N, Enright C. Hepatitis B knowledge and associated factors among people with chronic hepatitis B. Australian and New Zealand Journal of Public Health. 2015;39(6):563-8.
29. Alaridah N, Joudeh RM, Al-Abdallat H, Jarrar RaF, Ismail L, Jum'ah M, et al. Knowledge, attitude, and practices toward Hepatitis B infection among healthcare students—a nationwide cross-sectional study in Jordan. International Journal of Environmental Research and Public Health. 2023;20(5):4348.
30. Mubaraki MG, Alamir SA, Qohal MM, Alamir OH, Quadri MF. Relation between Knowledge, Attitude and Practice of Hepatitis B among Dental Undergraduates in the Kingdom of Saudi Arabia. The journal of contemporary dental practice. 2019;20(12):1447-55.