

# VIRAL HEPATITIS IN HEALTH SERVICE WORKERS IN THE PROVINCE OF WIELKOPOLSKA

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**Abstract.** Viral hepatitis is the most frequent occupational disease in the health service workers. On the ground of epidemiological data on certifications of occupational diseases, an analysis of morbidity of viral hepatitis was performed. Among viruses that can cause occupational hepatitis there are HAV, HBV and HCV. However, occupational HDV and HGV infections are also possible. In Poland, the number of hepatitis diagnosed as occupational diseases became more stable in the years 1996–1998, whereas morbidity of hepatitis C significantly increased. Such an epidemiological situation could be observed in the area of Wielkopolska and throughout the country. In the former province of Poznań and in the present province of Wielkopolska, occupational hepatitis occurred mostly in nurses. In the nineteen sixties and seventies, the most dramatic increase in the incidence of hepatitis B was noticed in the population of nurses and midwives at the age between 21 and 30 years. This can provide evidence of especially high exposure to infectious factors in this occupational group and of high HBV infectivity. Nowadays, an average age at the time of diagnosis of hepatitis C is somewhat higher. Hepatitis C is usually recognized at the age between 30 and 39 years. A relatively low infectivity of HCV and mostly asymptomatic course of the infection, which delays diagnosis, may provide some explanations of these phenomena. The geographical distribution of stated cases of hepatitis C is difficult to predict and may suggest that some non-medical factors also play a role. Since no specific measures to prevent the incidence of hepatitis C have been developed, a good recognition of HCV reservoir in the population of health service workers (particularly nurses) is one of possible methods to improve the epidemiological situation. It might also be necessary to discuss some limitations in work ability of infected persons. In addition, good training in occupational hygiene and how to handle infectious materials is essential for health service workers.

**Key words:**  
Hepatitis, Occupational disease, Epidemiology, Medical staff

## INTRODUCTION

Infectious diseases are a predominant group of occupational diseases among health service workers in Poland (64.4% in 1999) [1]. Besides confirmed cases of occupation-related hepatitis B and C, there are also cases of hepatitis A, but they are rather rare. In addition, hepatitis D virus (HDV) and hepatitis G virus (HGV) can also be transferred through occupational contacts [2].

Workers being in a permanent contact with a large number of patients, first of all with the mentally handicapped

or children are most vulnerable to hepatitis A infection [3]. The risk of hepatitis A infection among nurses of pediatric wards is three times higher than that in the general population [4]. The incidence of this infection is especially high among workers who take care of infected children without jaundice, but often with diarrhea. Theoretically, dentists could also be infected with HAV through contacts with patient's saliva.

Hepatitis B virus (HBV) may be transmitted via infected blood or systemic fluids, transcutaneously or through mucosa. The risk of HBV infection by a single uninten-

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tional needle stick is estimated between 25 and 30% [5]. The hepatitis B preventive program, implemented until 1999, put special emphasis on protective vaccinations [6]. Relatively less attention was paid to hygiene habits in health service institutions. The number of new cases of hepatitis B reported in 1999 decreased to 3507 from 15 308 cases in 1989. The percentage of people probably infected with hepatitis B in health service settings (about 60%) is still alarming. Such a situation does not occur in the countries of Western Europe. Patients of health care institutions in Western Europe are not regarded as a high-risk group, contrary to the medical staff.

The greatest risk of infection is associated with the exposure to infected blood. However, HCV-RNA was also detected in saliva of patients infected with hepatitis C via blood transfusion. The risk of HCV infection by a single stick of an infected needle is estimated at 1.2–10.0% (the most often reported value is 2%) [7].

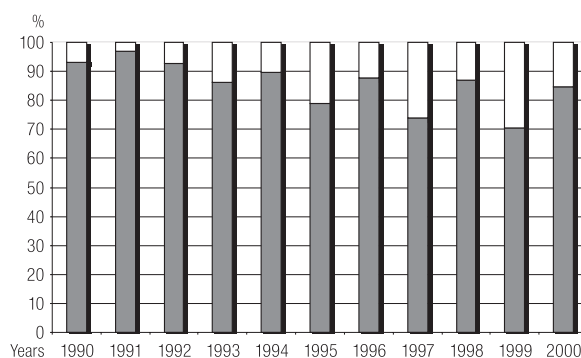
The aim of this project was to characterize the cases of occupational hepatitis based on the statistical data concerning the province of Wielkopolska and the former province of Poznań in the years 1990–2000.

## MATERIALS AND METHODS

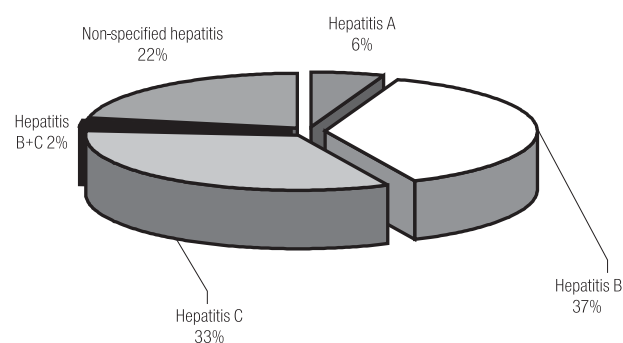
The data used as a basis for the analysis of occupational viral hepatitis in the region of Wielkopolska originated from the database on the occupational disease certification created by the Public Health Service in Poznań.

## RESULTS

In the years 1990–2000, hepatitis B, C, A and tuberculosis were the major occupational infectious diseases in the medical staff diagnosed in the area of Wielkopolska province and the former Poznań province. During the period between 1996 and 2000, 161 cases of occupational hepatitis were reported (22–40 cases a year). Recently, only a few cases of occupational infections with CMV, *Toxoplasma gondii* and *Salmonella typhi* have been registered (Fig.1).



**Fig. 1.** Viral hepatitis as a percentage of all occupational infectious and invasive diseases in the population of health service workers in the former province of Poznań (years 1990–1998), and in the province of Wielkopolska (1999–2000). Hepatitis marked in grey, other occupational infectious diseases in white.

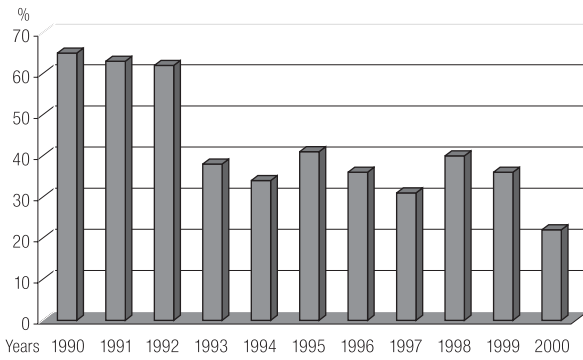


**Fig. 2.** Occupational hepatitis in the former province of Poznań, 1996–1998, and in the province of Wielkopolska, 1999–2000, with clinical division.

In the past decade, the confirmed cases of occupational hepatitis were mainly caused by HBV and HCV. The cases of hepatitis of unknown origin applied actually to occupational diseases certified in the distant past (the 1960s and 1970s) (Fig. 2). Single cases of hepatitis A were observed in the high-risk groups: nurses and baby-sitters (9 cases in 1996–2000) (Fig. 2).

It was the population of young people who were not immune to hepatitis A in contrary to the majority of adults in Poland who have been already infected in their childhood. It is important to emphasize that the majority of these people did work in the same health service institutions, where the procedure of applying for the occupational disease certification was well known.

The 1990s (from 1993) were characterized by the stabilized number of diagnosed viral hepatitis. Between 1993 and 1996, a systematic decrease in the incidence was



**Fig. 3.** Reported cases of occupational viral hepatitis in former province of Poznań, 1990–1998, and in the province of Wielkopolska, 1999–2000.

observed. At the same time the absolute number of new cases of infectious diseases in the population of health service workers also decreased. This decline was achieved due to some preventive activities, e.g. vaccinations against HBV. In the years 1996–1998, the number of hepatitis cases diagnosed as occupational diseases became more stable, whereas the incidence of hepatitis C was on the increase [1]. This epidemiological situation was observed in the province of Wielkopolska and in the other regions of the country [1] (Fig. 3).

Vaccination of high risk groups in 1989, and a further extension of the hepatitis B preventive program for the following years, resulted in a decreased number of new cases of hepatitis B among the health service workers in 1998–1999 (Table 1). It is interesting to note a sudden increase in the certification of occupational hepatitis (among people infected in the past). Having analyzed these data, one may draw a conclusion that the uncertain

**Table 1.** Certified cases of occupational viral hepatitis in the former province of Poznań, 1996–1997, and in the province of Wielkopolska, 1999–2000

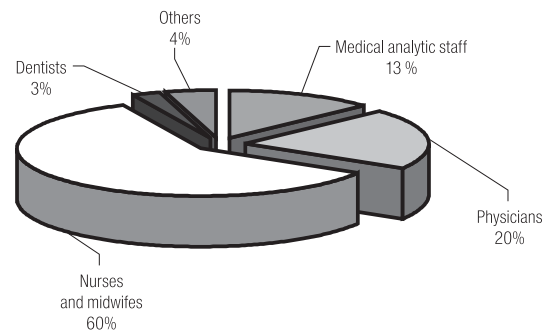
Year	Hepatitis B (cases diagnosed at least 3 years earlier)	Hepatitis B (new cases)	Hepatitis C
1996	3	8	6
1997	5	7	8
1998	10	5	15
1999	11	6	13
2000	4	1	11

situation of employment in the health service in that period contributed significantly to this situation (Table 1).

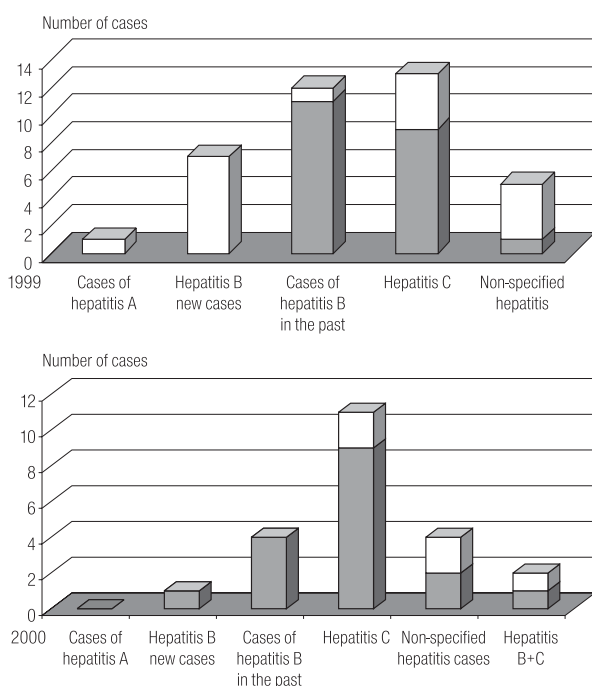
Some interesting information can be derived from an analysis of certified cases of occupational viral hepatitis in particular groups of medical care workers. In the area under study, nurses made the most numerous group with certified occupational hepatitis (Fig. 4). In the years 1990–1998, the number of hepatitis cases per 100 employees were largest in the group of medical laboratory staff (0.5) and nurses (0.3). The comparison between the number of new hepatitis cases and the number of workers employed in specific areas of health service shows that workers of diagnostic laboratories seem to be most vulnerable to this infection.

The outcome of the analysis of the geographical distribution of occupational hepatitis in the province of Wielkopolska is confusing (Fig. 5). It shows that the cases of certified occupational viral hepatitis are found mainly in the city of Poznań. There is not likely that the risk of HCV infection could be significantly higher in the city than in the remaining areas of the province of Wielkopolska (the second largest province in Poland in terms of the area and the number of specialized institutions). It is most possible that other factors may be responsible for this phenomenon, such as:

- possible lack of equal access to routine screening for anti-HCV antibodies (hepatitis C occurs in about 70% of patients with no specific clinical symptoms, therefore the registration of new cases of hepatitis C is incomplete),
- different “claiming” awarness among health care workers,



**Fig. 4.** Viral hepatitis as occupational disease in the former province of Poznań, 1983–1998, and in the province of Wielkopolska, 1999–2000, by medical professions.



**Fig. 5.** Viral hepatitis as occupational disease in the province of Wielkopolska, and the city of Poznań (dark), 1999–2000.

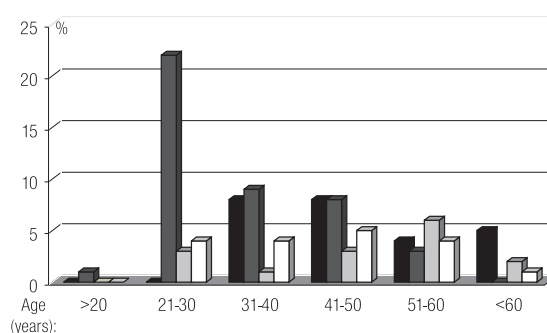
- inappropriate functioning of the occupational health service,
- present social and economic situation in the health service system.

It is important to note that incomplete estimation of the morbidity concerns also other occupational diseases occurring in health service workers in Poland as compared to other countries [8].

It is most likely that the “claiming” awarness plays a significant role in cases of hepatitis diagnosed several years before applying for the certified occupational disease. Such an observation was made first of all among health service workers employed in the area of the city of Poznań.

In the year 1999, there were still observed some significant differences between the number of new diagnosed cases of hepatitis B in Poznań and in the other parts of the province of Wielkopolska. It should be clarified whether higher incidence of new hepatitis B cases outside Poznań was associated with worse working conditions (Fig. 5).

Figure 6 shows the age of the health care workers at the diagnosis of viral hepatitis. The most dramatic increase in morbidity could be observed in the population of nurses and midwives at the age between 21 and 30 years (most of



**Fig. 6.** Age of health service workers at the time of diagnosis of viral hepatitis as an occupational disease in the former province of Poznań and in the province of Wielkopolska, 1998–2000. From the left: physicians, nurses and midwives, medical laboratory staff, others.

these cases were diagnosed at least 3 years before the certification of occupational disease). It shows particularly heavy exposure to infectious factors in this group in the past and high infectivity of HBV (the infection appeared shortly after the employee had started to work). Nurses are usually in very frequent and direct contact with patients and their body fluids. There are two important factors that should also be considered: the lack of experience in handling infectious materials and an inadequate professional training. Besides, nurses become professionally independent earlier than physicians. In a study performed on a small but statistically significant group of nurses, insufficient knowledge of prophylaxis and prevention of viral hepatitis was observed [9].

Hepatitis C is usually diagnosed at the age between 30 and 39 years. There are at least two reasons to be mentioned:

- HCV is relatively less infective (the risk of infection depends on the number of exposures which continues to rise with the duration of work); and

- infection is often asymptomatic, and thus the diagnosis is delayed.

## DISCUSSION

Prevention of viral hepatitis is the most essential problem of occupational medicine with regard to the health service workers. Over the past few years, viral hepatitis was the most frequently diagnosed infectious occupational disease in Poland including the province of Wielkopolska. The

1990s were characterized by positive trends in reducing the incidence of hepatitis B. The program of protective vaccinations, covering health care workers proved to be very effective. In Poland, a lot of funds have been spent on fighting hepatitis B and C, but at the same time the presence of these viruses was widely tolerated in health care settings (as a reservoir). In many countries, certain attempts have already been made to create some legal framework for solving this problem. Unfortunately, restrictions addressed to the health service workers who are carriers are burdened with high social costs. In the foreign literature, an opinion prevails that physicians who are HBsAg positive and perform procedures with an increased risk of hepatitis viruses transmission should inform their patients about a potential danger, and limit or cease performing the procedures that might involve the contact with their systemic fluids. In our country, according to the Regulation of May 30, 1996, issued by the Minister of Health and Social Welfare, all employees exposed to HBV and HCV should be tested for the infection under the prophylactic examination scheme [10]. Unfortunately, this is not a very frequent procedure.

The danger caused by occupational hepatitis B and C calls for the verification of the health service staff ability to work in terms of epidemiological safety. In consequence, the cases of occupational viral hepatitis may give rise not only to medical but also to social, economic and ethical problems. In the coming years a dominant role will have to be played by more restricted rules, following the preventive measures aimed at reducing the incidence of blood-borne infectious diseases among health care workers. These rules should be implemented through dealing with every patient not only with those whose positive results of serologic tests are known. It is really most important, as the vaccine against HCV is not as yet available, and the only way to prevent HCV infections is to assure non-specific prophylaxis. The results presented in this paper demonstrate that the registered number of HCV-infected health service workers is very far below the reality. These employees are thus, consciously or not, a reservoir of the virus that could be dangerous for patients. It seems that the need to study the HCV epidemiology in

the population of health service workers has already been highlighted. This knowledge is absolutely essential among nurses and midwives, as the cases of hepatitis C are particularly frequent in this occupational group. Also, the young age of the employees at the time of diagnosis may seriously influence their future health status and career. HCV is a recognized carcinogenic factor although the period of time between infection and neoplasm development may be quite long [11].

## CONCLUSIONS

1. In Poland viral hepatitis prevails among the infectious occupational diseases.
2. Occupational groups particularly vulnerable to viral hepatitis are: nurses, midwives and workers of diagnostic laboratories.
3. Claims for the certification of infectious occupational diseases is especially numerous in the times of employment uncertainty. Localization of certified cases of hepatitis depends on the place of employment and residence.
4. The number of new cases of hepatitis B decreases with increasing incidence of hepatitis C.
5. Hepatitis B develops shortly after starting a career (especially among nurses aged 21 and 30 years), but occupation-related hepatitis C occurs more often in the employees of the 30–40 age group. This could result from a lower infectivity and often asymptomatic and non-characteristic course of hepatitis C.
6. Asymptomatic course of HCV infection can delay the diagnosis of occupational disease. This may result in developing a more serious disease and putting the patients at higher risk.
7. Serologic examination of nurses for HCV infection should be suggested.

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