



Distribution of Hepatitis B Infection in Cleaning Services in Manado City, North Sulawesi

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ABSTRACT

Introduction: Hepatitis B is a disease caused by a viral infection and can be easily transmitted. Hospitals can be one of the places where Hepatitis B is transmitted. Hospitals produce waste that can be a source of transmission for several professions, both health workers and cleaning services or cleaning staff in hospitals because they are in direct contact with the source of Hepatitis B virus transmission.

Objective: This study aims to determine the description of the results of Hepatitis B examinations on cleaning service staff at hospitals in Manado, North Sulawesi.

Methods: This type of research is descriptive. With a random sampling technique. The samples found were 164 samples that met the sample criteria, then examined using the ELISA method. The results were declared positive for HBsAg if they exceeded the cut-off value obtained from the average value of the negative control. The data obtained are presented in table form and narrated descriptively.

Results: The research results show that there are more female respondents than male respondents, namely 94 people (57.3%) with a greater age range above 36 years (60.4%) with a working period of less than 10 years (62.8%). More respondents with less knowledge of hepatitis B and many have not been vaccinated (82.9%). And it was found that the use of complete PPE was around 108 (65.9%) respondents. 4 (2.4%) respondents obtained the results of the examination using the ELISA method that exceeded the cut-off value.

Conclusions: The conclusion of this study is that 2.4% of respondents were positive for Hepatitis B and all worked at Prof. Dr. R. D Kondou Hospital.

Introduction

Hepatitis is a disease characterized by inflammation of the liver. One important type of hepatitis is hepatitis B. It is estimated that around 240 million people suffer from chronic hepatitis B. The hepatitis B virus (HBV) is the main cause of hepatitis B, which attacks the liver, is acute

and highly infectious, and has infected many people worldwide (Siswanto, 2020).

Hepatitis B is a global health problem. Based on WHO data, 44 countries reported 14,000 cases of acute hepatitis B infection in 2020 (WHO, 2020). Based on Riskesdas, the prevalence of hepatitis B virus in Indonesia in 2018 was around 7.1% (around

18 million people). This virus is highly contagious, which can cause liver cirrhosis, liver cancer, and even death. Based on the results of the 2018 Basic Health Survey (Riskesdas) in North Sulawesi, the number of hepatitis cases was 0.47% (25,661 people), and specifically Manado City had a hepatitis case rate of 0.59% (4,467 people). The fourth largest city in North Sulawesi.

Hospitals pose occupational risks to workers through substantial medical and infectious waste production. Judging from the nature of hospital work, it can be said that health workers are workers who are at risk of contracting occupational diseases because they come into contact with sick patients every day. However, workers outside the medical field can also contract occupational diseases even though they do not have direct contact with patients.(Setiawan, 2019). Cleaning service workers are at risk of exposure to hazardous biological materials (biohazards) through contact with disposable medical equipment when cleaning laboratories or rooms containing viruses and bacteria, and through injuries from sharp objects such as injection needles when handling medical waste, which can lead to infections such as hepatitis (Amalia and Sari, 2020a).

Based on research conducted by Agussamad (2019), it was found that 17 cleaning service workers were pricked by

needles because the workers did not comply with the use of Personal Protective Equipment (PPE).(Assen et al., 2020). Cases that can occur in hospitals are needle stick injuries (NSI). NSI is a term for work accidents caused by needle stick injuries or sharp medical objects that have been contaminated with infectious fluids from patients. This incident is very risky for contracting infectious diseases when the skin is pricked by a used needle and contaminated with the patient's blood.(Suksatan et al., 2022). Comparable research at Nairobi Hospital found 5/185 (2.7%) cleaning staff HBV-positive, linked to PPE non-compliance (Kangethe & Komu, 2021), while BCM Pelaihari Hospital reported 1/24 positives (Amalia & Sari, 2020a). Based on the preceding background, this study aims to describe the prevalence and distribution of Hepatitis B surface antigen (HBsAg) positivity among cleaning service personnel across hospitals in Manado City, North Sulawesi.

Methods

This research is descriptive and was conducted from January to May 2023. Sampling was taken from 5 hospitals in Manado City, North Sulawesi Province, namely Prof. Dr. RD Kandou General Hospital, GMIM Pancaran Kasih General Hospital, Robert Wolter Mongisidi Hospital, Eye Hospital, and Bhayangkara

Hospital. Ethical approval was obtained from the Ethics Committee of the Manado Health Polytechnic, Ministry of Health (No. KEPK.01/04/028/2023). In the study, blood specimens were taken aseptically using a serum separator tube and the samples were placed in a safety box at a temperature 4°C to be taken to the Immunoserology Laboratory of the TLM Department of the Ministry of Health, Manado Health Polytechnic. The population in this study was Cleaning Service officers who worked at hospitals in Mando, North Sulawesi. A total of 164 participants were recruited via random sampling.

The materials used in this study were washing solution and distilled water (aquadest). The tools used were SST tubes, tube racks, tourniquets, alcohol swabs, plaster, disposable syringes, labeling/markers, dry cotton, centrifuges, micropipettes, timers, ELISA readers, incubators, microwells, micro tubes, coolboxes and ice packs.

HBsAg examination was conducted based on the ELISA method using the ELISA Reader Vidas tool. The examination procedure used the KIT Insert tool. Cut-off values of more than 0.107 were declared positive and those less than 0.107 were declared negative. The data obtained are presented in a table and explained descriptively.

Results and Discussion

Among 164 cleaning service workers screened in this study, 4 participants (2.4%) tested positive for hepatitis B surface antigen (HBsAg), while 160 (97.6%) tested negative (Table 1). All four positive cases were asymptomatic (100%), with no participants reporting clinical symptoms of hepatitis B infection. Regarding gender distribution, female respondents predominated, accounting for 94 individuals (57.3%), compared to 70 males (42.7%). In terms of age, the majority of participants were over 36 years old (99; 60.4%), exceeding those aged 36 years or younger (65; 39.6%).

Table 1. Examination results, Symptoms, Gender, and Age

Variable	Category	n	%
Check-Up Result	Positive	4	2.4
	Negative	160	97.6
Symptoms	Symptomatic	0	0.0
	Asymptomatic	164	100.0
Gender	Men	70	42.7
	Women	94	57.3
Age Group	≤ 36 Years	65	39.6
	> 36 Years	99	60.4
Total respondents		(N) = 164	

Based on the results in Table 2. Based on the length of service, it was found that there were more workers under 10 years, namely 103 (62.8%) compared to workers over 10 years, namely 61 (37.2%), while based on knowledge about Hepatitis B, it was found that 98 (59.8%) did not know and 66

(40.2%) already knew about Hepatitis B, based on Hepatitis B vaccination 136 (82.9%) had not been vaccinated and 28 (17.1%) had been vaccinated, based on the use of complete PPE during work, it was found that 108 (65.9%) used complete PPE and 56 (34.1%) did not use complete PPE at work.

Table 2.Based on length of service, Hepatitis B knowledge, vaccination and use of complete PPE

Variable	Category	n	%
Length of Service	< 10 Years	103	62.8
	≥ 10 Years	61	37.2
Hepatitis B Knowledge	Yes	66	40.2
	No	98	59.8
Hepatitis B Vaccination Status	Already Vaccinated	28	17.1
	Not Vaccinated Yet	136	82.9
Complete Use of PPE	Yes	108	65.9
	No	56	34.1
Total respondents		(N) = 164	

From the results above, 4 of 164 respondents (2.4%) tested positive for hepatitis B but showed no symptoms. Hepatitis B causes symptoms ranging from asymptomatic to severe cases like hematemesis (vomiting blood) or coma (Salsabila et al., 2020). Over 65% of infected individuals remain asymptomatic or exhibit mild flu-like symptoms, allowing undetected chronic infection (Dwi Yulia, 2020).

Although more female respondents participated than males, the 4 positives

included 2 males and 2 females. Males showed a higher positivity rate (2/70 vs. 2/94). This aligns with 2013 Ministry of Health data indicating higher male hepatitis B prevalence (Libangkes Ministry of Health, 2013), and studies linking elevated testosterone to increased liver cancer risk and higher viral loads in males versus females (Rambe et al., 2022). Most workers were over 36 years old—a productive age with elevated risk factors (Rambe et al., 2022)—though infection is rarer in the elderly due to viral clearance post-acute phase (Kolou et al., 2017).

Meanwhile, based on length of service, more people have worked for less than 10 years, as well as respondents who tested positive for hepatitis B, all 4 of whom have worked for less than 10 years, which means that length of service does not guarantee that someone can get hepatitis B or not. This is also related to workers' knowledge of Hepatitis B, where the level of knowledge of Hepatitis B still tends to be lacking among Cleaning Service workers in Hospitals. In a study conducted by Suantika, et al. in 2022, it was stated that there was a relationship between knowledge and community behavior about hepatitis. Researchers argue that knowledge about hepatitis can help the community identify risks and take appropriate steps to prevent hepatitis (Suantika, et al. 2022). This is in contrast to a study conducted by Dwiartama

et al. in 2022, where the level of knowledge of hepatitis was not directly proportional to the prevention behavior in the community. It is said that one possible reason why respondents' knowledge does not match prevention practices is that knowledge itself does not guarantee a person's compliance with preventive measures.

Most participants (136; 82.9%) remained unvaccinated against hepatitis B, compared to only 28 (17.1%) who had received vaccination. The hepatitis B vaccine provides essential protection and significantly reduces the incidence of chronic liver disease and hepatocellular carcinoma. The recombinant hepatitis B vaccine used in adults—widely adopted globally—contains only the virus's surface antigen protein produced through recombinant DNA technology, ensuring safety without using the live virus itself (Ministry of Health of the Republic of Indonesia, 2023). Vaccines function as antigens that stimulate the body's immune system; once vaccinated, individuals produce specific antibodies that rapidly neutralize invading viruses upon exposure, deploying lymphocytes to destroy and eliminate them effectively (Ministry of Health of the Republic of Indonesia, 2023).

Although most workers (108; 65.9%) reported using complete personal protective equipment (PPE), 3 of the 4 hepatitis B-positive cases still claimed consistent PPE

use. Johana et al. (2022) demonstrated that knowledge levels and attitudes toward PPE critically influence its effectiveness, as physical discomfort often leads to improper or incomplete application despite having full equipment, while inadequate hygiene maintenance further compromises protection against viral exposure. Standard operating procedures (SOPs) for PPE—comprising detailed, step-by-step written instructions for routine and repetitive tasks—are therefore essential to ensure proper implementation (Puti Khairunnisak, 2019).

Notably, 3 of 4 HBsAg-positive cases (75%) reported complete PPE use, suggesting compliance alone is insufficient against occupational HBV exposure. Possible explanations include micro-tears in gloves during prolonged use, inadequate PPE hygiene between shifts, or unrecognized percutaneous injuries during waste segregation (Johana et al., 2022). This study's 2.4% prevalence closely mirrors Nairobi Hospital's 2.7% (5/185) among cleaning staff (Kangethe & Komu, 2021) but exceeds BCM Pelaihari's 4.2% (1/24) (Amalia & Sari, 2020a), indicating consistent moderate HBV burden in hospital cleaning personnel across diverse settings and underscoring need for facility-specific transmission control beyond PPE reliance.

Hepatitis B examination in this study employed the enzyme-linked immunosorbent assay (ELISA) method, one of the primary immunological techniques designed to determine or measure levels of protein activity as well as the immune reaction status in individual samples. The ELISA method offers notably high sensitivity and specificity, attributed to the precise and specific binding between antigens and antibodies. This technique detects the presence of antigens and antibodies through visible color changes generated by enzyme-linked conjugates reacting with appropriate substrates (Andayani, 2023).

This study provides baseline Hepatitis B prevalence data among an understudied group—hospital cleaning service workers—in Manado City, with its multi-hospital design capturing diverse occupational exposure patterns. Key strengths include standardized ELISA testing and comprehensive variable assessment (demographics, knowledge, vaccination, PPE). However, the descriptive cross-sectional design precludes causality inference due to the absence of statistical analysis. Self-reported PPE compliance and vaccination data risk recall bias, while lack of viral load testing limits chronicity assessment. Future analytical studies with multivariate statistics and

objective exposure measures are recommended.

Conclusion

This study identified a 2.4% Hepatitis B surface antigen (HBsAg) prevalence rate among 164 hospital cleaning service workers screened across five facilities in Manado City, North Sulawesi. All four positive cases were asymptomatic and notably clustered at Prof. Dr. RD Kandou General Hospital. Despite majority reporting complete personal protective equipment (PPE) use (65.9%; n=108) and a predominantly productive-age workforce (>36 years: 60.4%), alarmingly low vaccination coverage (82.9% unvaccinated; n=136) coupled with knowledge deficits (59.8% lacking Hepatitis B awareness) underscore the critical need for targeted occupational health interventions, including mandatory vaccination programs and enhanced training for this high-risk, understudied population.

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