Evaluation of hepatitis A, B and C serological assays and complete blood count results in medical school students

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Abstract

Aim: Healthcare workers are at high risk for infectious diseases that can be transmitted from patients and the physical environment. In addition, university students staying at dormitories are at risk for anemia due to nutritional disorder. In this study, our aim is to conduct serological screening of hepatitis A, B and C and to complete the missing vaccinations and to conduct complete blood counts, and to perform the necessary treatments in medical faculty students.

Material and Methods: The study was conducted on the first-year students in Malatya İnönü University Faculty of Medicine, between September and October 2017. SPSS ver. 22.0 software is used in analysis of the data. A value of $p<0.05$ was considered statistically significant.

Results: A total of 302 students participated in the study; 153 (50.7%) were female and 149 were (49.3%) male. We found that, anemia is present in 8% of the students, HbsAg is positive in 1.2% and Anti HCV is positive in 0.66% of the students. In addition, 13% of students had not been immunized against Hepatitis B, and 60% had not been immunized against Hepatitis A.

Conclusion: The results of our study suggest that serological analysis of HAV, HBV and HCV and to ensure necessary immunization is required and screenings for anemia should also be performed, in order to keep education performance of medical students at a sufficient level.

Keywords: Medical Student; Complete Blood Count; Hepatitis A, B, C, Serology.

INTRODUCTION

Viral hepatitis is an infectious disease that is pandemic in all over the world. It is estimated that the incidence of hepatitis A (HAV) is 1.5 million people in the world, whereas the actual incidence is thought to be 10 times more (1). Hepatitis A infection often causes fatigue and debility. These symptoms usually last less than two months. Epidemiology of Hepatitis A virus has shown a "shift pattern" in many Asian and Middle Eastern countries over the last 10-20 years (2).

It is estimated that that there are 350 million people infected with hepatitis B (HBV) and 2 million people are carriers, in the population (3).

According to the World Health Organization (WHO) classification, Turkey is one of the countries with intermediate (2% - 8%) endemicity for hepatitis B (4). In the literature hepatitis B is reported to cause chronic liver disease and liver carcinoma and it is reported that incidence of HBV infection in health workers is 2-4 times higher than normal population (3,5).

The prevalence of Hepatitis C virus (HCV) ranges between 0.5 and 2% in the world and between 0.3 and 1.6% in Turkey (6). HCV infections often become chronic. Since HCV is mostly transmitted by blood and body fluids, health care workers should be more careful when performing invasive procedures.

Anemia can be considered a public health problem because it is one of the most common disorders in the society. The main cause of anemia is iron deficiency, which is usually seen in people with low socioeconomic conditions (7). According to the 2011 records of the WHO, 800 million children and adolescents were diagnosed with anemia in the world (8). Iron is used extensively in the human organism, in case of its' deficiency, all systems are affected and some multisystemic findings appear (9).

Healthcare workers are at high risk due to infectious agents that can be transmitted by the infected patients and the physical environment while they are working. On

the other side, patients are also at risk if the health care workers are carriers. The aim of this study is to conduct serological analysis of hepatitis A, B and C to complete the missing vaccinations and to conduct complete blood count screening and to start treatment if necessary in the medical faculty students.

MATERIAL and METHODS

This study includes 302 first year students of the Medical School of İnönü University, who accepted to participate in the study verbally between September and October 2017. Two tubes of venous blood samples were collected from the antecubital vens.

Complete blood counts and serological analysis of hepatitis A, hepatitis B and hepatitis C viruses were performed. All laboratory analyzes were performed with the Sısmıs hemogram device, and Abott Architect i2000 sr modulators in the laboratories of Turgut Özal Medical Center Hospital. The study is based on the limitations accepted by our laboratory for anemia, HAV, HBV and HCV.

Statistical evaluation of the research data was performed by using IBM SPSS for Windows version 22.0 software. The arithmetic mean (X) and (min-max) were used to define the quantitative variables and the number (n) and percentage (%) were used to describe the qualitative variables. Pearson chi-square and Fisher's exact test were used to compare data on qualitative variables. In all tests, a value of $p < 0.05$ was considered statistically significant.

RESULTS

A total of 302 students participated in the study, 153 (50.7%) were female and 149 (49.3%) were male. The mean age of the students was 19 years (min = 17, max = 30). Turkish citizens made up 91.4% of the students (n = 276) and 8.6% (n = 26) were foreign nationals.

The lower hemoglobin levels of 12 g/dL for female students and 13 g/dL for male students were accepted to indicate anemia. Regarding HAV immunization, the students with Anti HAV IgM (-) andAnti HAV IgG (-) were accepted to be non-immunized against hepatitis A virus and those with HbsAg (-) and Anti Hbs (-) were accepted to be non-immunized against hepatitis B virus. HbsAg was positive in 4 (1.32%) students. Anti-HCV was positive for 2 (0.66%) students. In these students, HCV RNA PCR was negative. The laboratory findings of the students are summarized in table 1 and table 2.

Table 1. Hepatitis A, B and C laboratory data of students according to sex			
	Female (n=153)n (%)	Male (n=149)n (%)	p
Non-immunized against hepatitis A	109 (71.2)	73 (49.0)	0.001
Non-immunized against hepatitis B	14 (9.2)	24 (16.1)	0.06
Anti HCV	151 (98.6)	149 (100.0)	

Table 2. Anemia values of students according to sex			
Anemia	+ n(%)	- n(%)	p
Female	22 (14.4)	131 (85.6)	0.001
Male	1 (0.7)	148 (99.3)	

The number of students immunized against hepatitis A and the number of those with anemia were statistically significantly higher in the girls ($p < 0.001$ for both). There was no statistically significant difference between the sexes in terms of hepatitis B immunity (p = 0.06).

In the comparison of immunity according to the students' nationality, only the level of hepatitis B immunity was significantly lower in foreign students ($p < 0.001$)

DISCUSSION

Viral hepatitis is considered as an important public health problem in our country. The doctors frequently encounter with viral hepatitis infection by close contact and percutaneously while performing their job (6). It is reported that 304 thousand health care personnel encounter with the risk of HBV transmissionin the world per year (10). In our country, adults at risk have been recommended to be vaccinated against hepatitis B since 1998. Hepatitis B vaccination was administered as a part of the Expanded Immunization Program since 2006 (11).

Our country is among the mid-level endemic countries such as Latin America, Brazil and Iran in terms of hepatitis A prevalence (19). In a study conducted on adolescents, in Saudi Arabia, 81.4% of the population was found non-immunized against HAV (20). In another study conducted in the north of Italy 70% of the adolescents was found non-immunized against HAV (21). In a study conducted in nursing students in our country, this rate was found to be 42.3% (22). In the study conducted by Çetinkol et al., 60.5% of adolescents were found to be non-immunized (23). In our study, similar to Çetinkol et al., we found that 60.3% of the students were non-immunized. Improving hygiene conditions in our country is suggested to decrease the rate of children infected with HAV. However, the fact that there are still so many non-immune learners indicates that medical school students should be screened and vaccinated at the time they begin school.

In studies conducted on medical school students in Korea and Athens, it was found that 23.1% of the students were non-immunized against hepatitis B in Korea (12) and 15.6% in Athens (13). In our country, the studies conducted before the Ministry of Health Program reported that approximately 70-80% of population was not immunized before the recommendation of Hepatitis B vaccination to risky groups whereas these rates decreased by 20 to 25% after the immunization program (14,15,16,17). Similar to the studies conducted in the recent years, we found that 12.6% of the students were not immunized. In the literature, it is emphasized that the most risky period for healthcare workers is education period in terms of HBV, and therefore, students who are educated in medical faculty, dentistry, nursing and laboratory branches should

be vaccinated (18). The results of our study indicated that medical students are still not fully aware of the issue although they are in a risky occupational group. Therefore we suggest that awareness should be raised on this issue.

Regarding HCV, the most dangerous viral infection for healthcare workers, the studies conducted abroad reported to be 0.1 to 2.5% Anti-HCV positivity (24, 25). In our country the positive Anti-HCV rate was found between 0 and 1% (17, 26). In our study, we found that the rate of anti HCV positivity was 0.66% and the students with esults by HCV RNA PCR studies were followed up.

Anemia is especially common among children and women. The most frequent symptoms include exhaustion, debility, tachycardia, as well as lack of attention, obliviscence, and learning difficulties, which can make it difficult for students to learn. In a study conducted in Kuwait, anemia was detected in 29.6% of females and 24% of males (27). In the United States anemia was detected in 9% of females and 2% of males, (28) and in Australia anemia was detected in 11.5% of females and 8.7% of males (29). In the studies conducted in our country, the frequency of anemia in the population older than 14 years was found to be 16.3% (30). Yavuz et al. in a study conducted on adolescents detected anemia in 7.1% of female students, 4.8% of males, and 5.9% in both sexes (31). In our study, we found anemia rates as 7.3% in females, 0.7% in males and 7.6% in both sexes. Given that 95.7% of those with anemia were female students; our results confirm that menstrual blood loss cause anemia to be seen in female students more frequently (32). It is obvious that university students usually do not have breakfast and do not have balanced nutrition due to the anxiety of the exam and catching up with the lessons. For this reason, we think that university students should be given regular trainings on nutrition and financially should be supported in order to provide balanced nutrition.

CONCLUSION

In our study, we found that 8% of the students had anemia, 1.2% were HbsAg positive and 0.4% were AntiHCV positive, 13% of them were non-immunized against Hepatitis B, and 60% were non-immunized against Hepatitis A. As a result of these findings, we suggest that serological assays of HAV, HBV and HCV should be performed and medical school students should be immunized before they contact with patients. We also need to perform complete blood count screening and if necessary, to start treatment in order to keep their training performances at a sufficient level.

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