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DETERMINE THE SEROEPIDEMIOLOGICAL SPREAD OF HEPATITIS C PATIENTS IN NAMANGAN

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Abstract. To assess the true prevalence of HCV and understand the epidemiological features of the infection in different territories, seroepidemiological population studies are needed. Depending on the epidemiology in each region, HCV infection may be concentrated in certain risk groups (for example, among people who inject drugs) and/or age groups. The main objective of the study was to determine the burden of HCV infection on the general population and identify the most affected age groups. According to the results of the study, 91% of the oldest group showed a positive result despite the treatment therapy.

Keywords. *Hepatitis C, RT-PCR, genotypes of the virus, isolate RNA.*

Introduction. Hepatitis C (HC) is one of the most important medical and social health problems in many countries of the world, including the Republic of Uzbekistan, which is due to significant socio-economic damage, widespread distribution, severity of the course and active involvement in the epidemic process of people with - productive and working age [14, 13]. According to World Health Organization (WHO) estimates, currently the number of people infected with hepatitis C virus (HCV) reaches 130–200 million people. About 350,000 people die annually from the consequences of hepatitis C [7]. The introduction of modern antiviral drugs can cure approximately 90% of people with HCV infection and thus reduce the risk of death from cancer and liver cirrhosis, as well as the number of new cases of infection [5,18]. Thus, early diagnosis and timely treatment of chronic hepatitis C (CHC) are the most promising measures in the fight against the epidemic of this infection [3,2,20]. HCV is a common viral infection in the Republic of Uzbekistan. The territory of Uzbekistan since the 60s of the twentieth century. has become a highly endemic region for the incidence of viral hepatitis. The last one was in the period 1963–1987 increased to 1250–1500 cases and higher per 100 thousand population. The incidence in children under 14 years of age was 1400–2200 cases per 100 thousand population. The absence of specific highly sensitive laboratory research methods during this period contributed not only to the increase in the incidence of chronic viral hepatitis, but also to their rapid spread throughout the country. Thus, chronic hepatitis was 23–27 per 100 thousand population, and HbsAg carriage rates were 42.3–54.2 per 100 thousand population. In the 90s of the twentieth century. The incidence of viral hepatitis began to decline; in 2006, the intensive incidence rate was 112.9 per

100 thousand population, but at the same time, an increase in the incidence of chronic hepatitis, as well as mortality from chronic liver diseases and cirrhosis, began to be observed. Officially, HCV began to be registered in Uzbekistan in 1998. Over the past 10 years, the frequency of chronic viral hepatitis C has increased 4 times. A study of the etiological structure of viral hepatitis using enzyme immunoassay showed that in Uzbekistan the share of viral hepatitis A is 31.3%, B - 30.3%, C - 6.2%, D - 4.8%; the proportion of mixed hepatitis (combination A, B, C) was 26.4% [6,10,16].

To assess the true prevalence of HCV and understand the epidemiological features of the infection in different territories, seroepidemiological population studies are needed. Depending on the epidemiology in each region, HCV infection may be concentrated in certain risk groups (for example, among people who inject drugs) and/or age groups [1,19]. The distribution of HCV genotypes in different risk groups and age cohorts may also vary [9,17].

The purpose of the study is to determine the prevalence of HCV infection among the population of the Namangan region.

Materials and methods. The study included blood serum samples obtained from patients diagnosed with HC among the population of the Namangan region districts: Chust, Pap, Kasansay, Turakurgan.

A total of 106 blood serum samples were examined: Informed consent for the study was obtained from all study participants. All study participants were divided into 4 age groups: 19-29, 30-40, 41-51, 52-71; each group consisted of about 22-34 people. The male to female ratio was 1:1.78 (22.5%, 32%, 24.5%, 21%, respectively).

To isolate RNA from blood plasma, we used a SET OF REAGENTS FOR ISOLATING NUCLEIC ACIDS PROBA-NK (manufacturer DNA technology).

The amount of HCV was determined by real-time PCR. In all blood serum samples, HCV RNA was determined by reverse transcription polymerase chain reaction (RT-PCR) using primers to the 5' untranslated region (5'-UTR). Isolation of nucleic acids was carried out using the kit “OT-HEPATOGEN-C quantitative - SET OF REAGENTS FOR QUANTITATIVE DETERMINATION OF HEPATITIS C VIRUS (HCV) RNA BY REAL-TIME RT-PCR METHOD (manufacturer DNA technology)” according to the manufacturer’s protocol from blood serum samples in a volume of 140 µl The conditions for the first round of PCR combined with reverse transcription were as follows: 45°C for 60 min, 94°C for 5 min, then 45 PCR cycles: denaturation at 94°C for 10 s, annealing at 62°C for 20 s and extension chains at 72°C – 45 s. Detection was carried out in real time. Positive and negative controls were used and standards were prepared to form a standard curve.

Results and discussion. RNA was extracted from blood plasmas of patients diagnosed with hepatitis C. Extracted RNA samples were reverse transcribed into DNA. Hepatitis C in the blood of patients was analyzed as a result of real-time PCR.

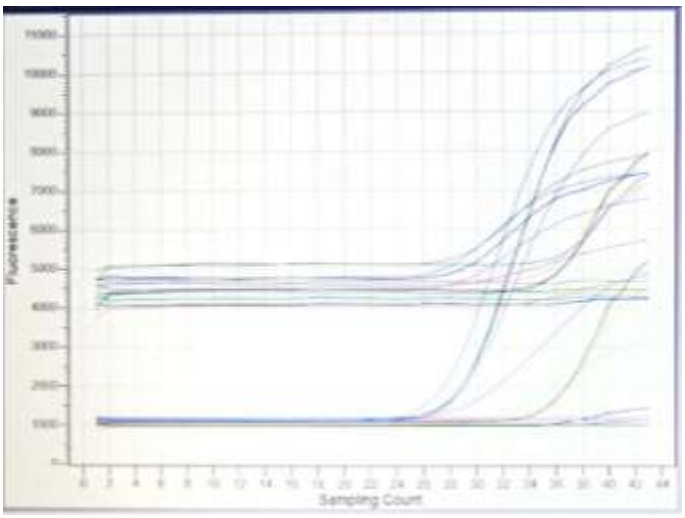

Figure 1. PCR result in real time

In doing so, separate standard mixtures were prepared for the standard deviation. The standard curve was used to quantify DNA.

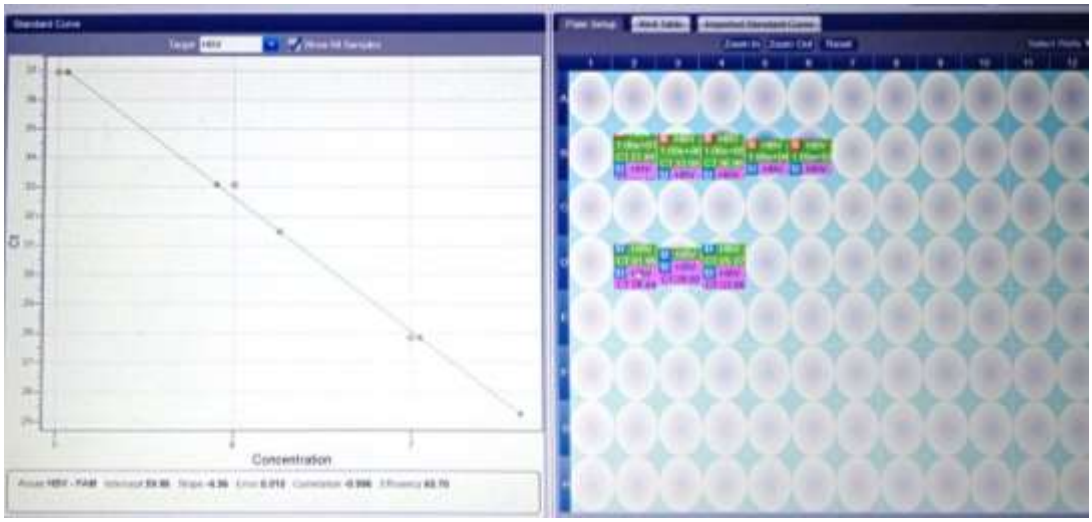

Figure 2. Standard curve superimposed on real-time PCR

Fam and HEX dye channels were selected according to the protocol for detection of hepatitis C in real-time PCR. Here is an example of a positive test result for hepatitis C in a sheep.

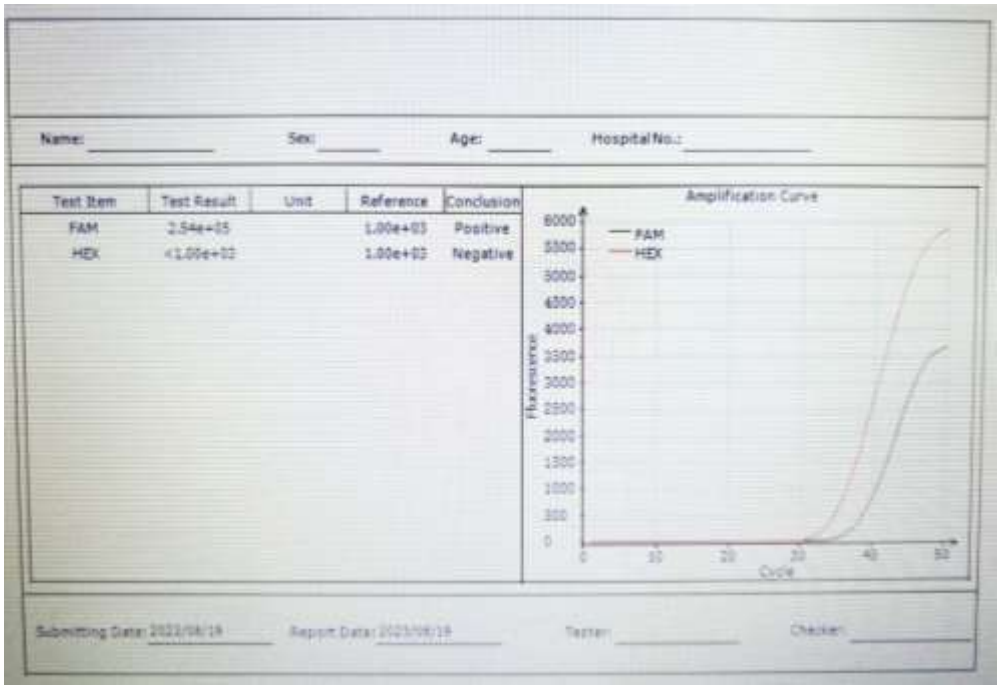

Figure 3. Here is an example of a positive result obtained as a result of hepatitis C analysis

The main goal of the study is to determine the post-treatment indicators of hepatitis C patients in Namangan region, which allows to draw conclusions about the effectiveness of hepatitis C therapy in Namangan region. The indicators of the samples taken from 106 patients who participated in the study were determined by age, gender and diagnosis results. According to that, 62 of 106 patients showed positive and 44 negative results. 68 of them were women and 38 were men.

	Number of patients	Percentage
positive	64	60,3
negative	42	39,7
female	68	64,1
male	38	35,9
total	106	100

Table 1. PCR results and gender indicators of patients

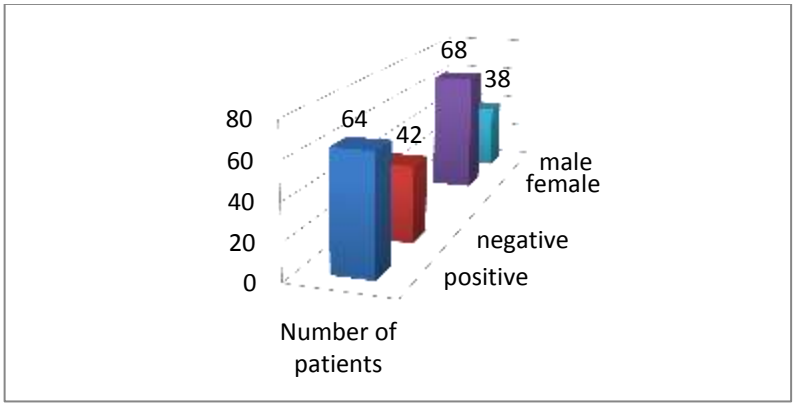

Figure 4. General characteristics of patients by PCR result and gender

Of the 38 men, 20 (53%) were positive and 18 (47%) were negative. Of the 68 women, 42 (62%) were positive and 26 (38) were negative. This means that the curative therapies in Namangan hospitals have better survival rates in women compared to men.

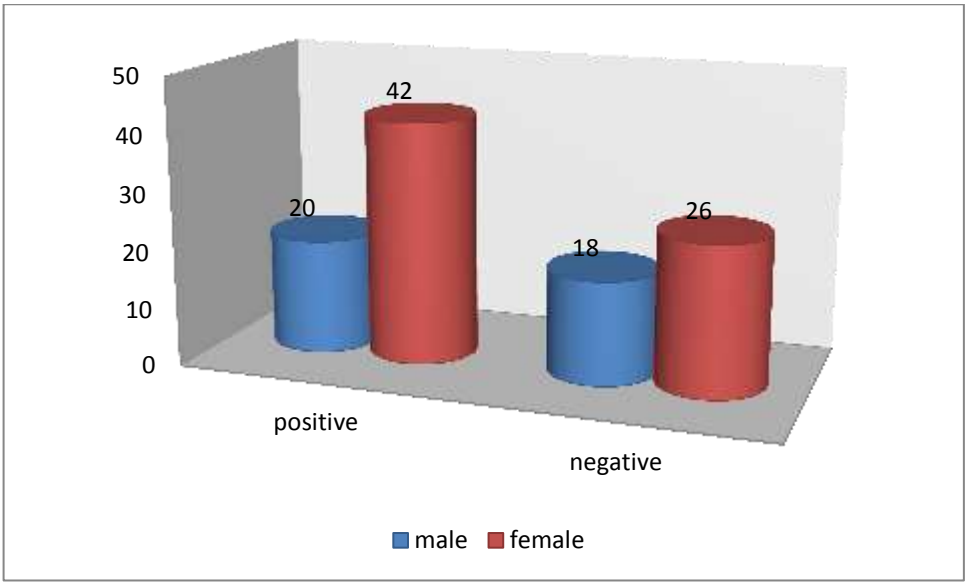

Figure 5. Proportion of positive and negative results in women and men

Also, within the framework of the study, the results of the hepatitis C analysis of the age differences of the patients were studied. According to it, the patients were divided into 4 groups and the gender ratio of each group was studied and the following table was created:

AGE	19-29	30-40	41-51	52-71
male	8	12	4	14
female	16	22	22	8
total	24	34	26	22

Table 2. Age groups and gender ratio

The results of this study by age groups show that the majority of patients are between 30-40 years of age, and women are more likely to develop hepatitis C than men between the ages of 30-51 and men after the age of 52.

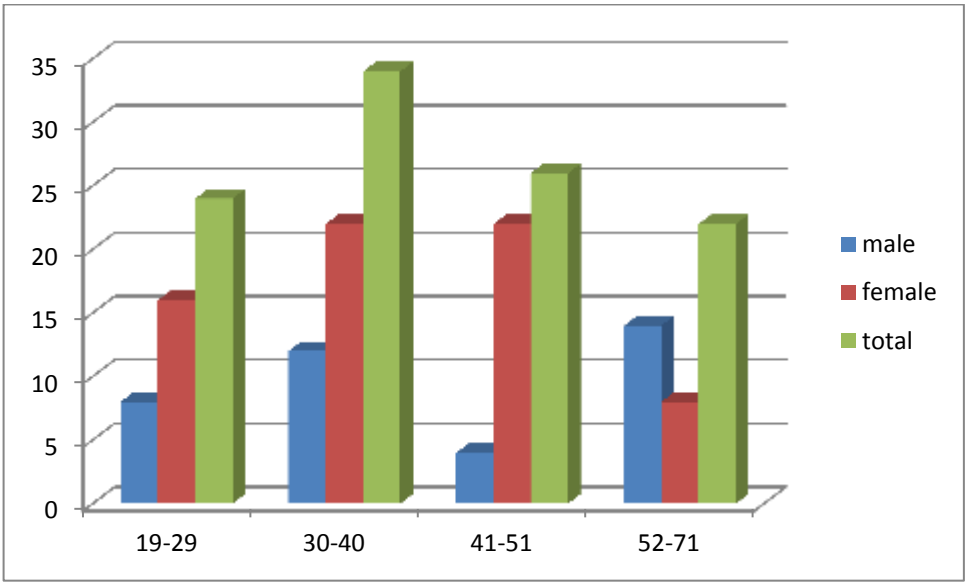

Figure 6. Age groups and gender ratio

In the framework of the study, indicators of positive and negative results were studied for 4 age groups of patients. According to it, 12 of 24 patients (50%) in the age range of 19-29 are positive, 12 (50%) are negative, 14 of 34 patients (41%) in the age range of 30-40 are positive,

20 (59%) are negative, 41- 16 of 26 patients aged 51 (61.5%) showed positive results, 10 (38.5%) showed negative results, and 20 (91%) of patients aged 52-71 years showed positive and 2 (9%) negative results.

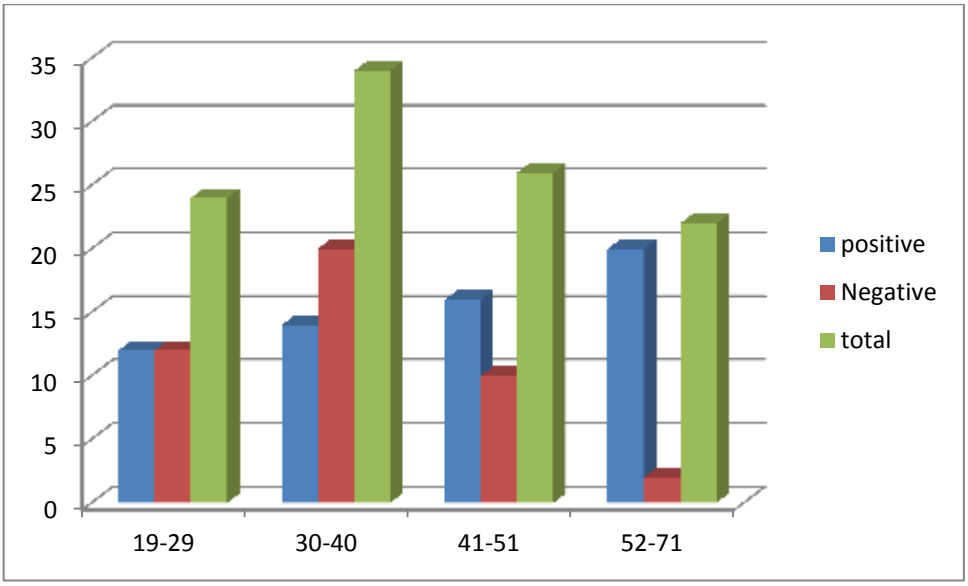

Figure 6. Ratio of PCR results by age groups

These results show that the majority of hepatitis C patients become less likely to recover as they age. According to the results of the study, 91% of the oldest group showed a positive result despite the treatment therapy.

The main objective of the study was to determine the burden of HCV infection on the general population and identify the most affected age groups. This information is necessary to clarify the cohorts in which it is advisable to concentrate screening programs aimed at the most complete identification of HCV-infected individuals. Similar studies conducted in the United States demonstrated the highest detection rate of anti-HCV (up to 4.3%, which is 5 times higher than in the general population), in the group of people born between 1945 and 1965. [8]. This ultimately led to the emergence of recommendations for anti-HCV screening for this generation and a shift in the focus of screening programs from risk groups to age cohorts [7, 6].

According to official registration of incidence, the highest incidence rate of HCV, reflecting the number of new cases of HCV infection, in the Russian Federation is registered in the age group of 20–29 years, which accounts for 39–45% of all registered patients with HCV. In terms of the incidence of CHC, most districts are occupied by people aged 30–39 years, who account for about 33–38% of all patients with CHC [10].

The results of this population-based study indicate the highest detection rates of HCV RNA. In total, three models of HCV transmission are distinguished based on seroepidemiological data. In countries characterized by the first model (USA, Australia), most cases of infection are detected among people aged 30–49 years who became infected in the relatively recent past (10–30 years ago). In countries characterized by the second model of HCV transmission (Japan, Italy), most cases of infection are registered among elderly people infected, apparently, in the distant past. In countries with a third pattern of HCV transmission (eg Egypt), high rates of infection are observed in all age groups, indicating a continued risk of HCV transmission. In countries with the first model of virus transmission, injection drug addiction is the dominant risk factor, while in the second and third models of HCV transmission, unsafe injections and contaminated equipment used in medical procedures play a major role in the spread of the virus [15].

Conclusion

Thus, the results of the seroepidemiological study demonstrated a high degree of HCV infection in the adult population of the Namangan region. The spread of HCV among young adults and older adults appears to be associated with different risk factors and different genotypes of the virus. In each of the surveyed regions, the age cohorts most affected by HCV were identified, for which inclusion in regional screening programs is advisable.

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