Seroprevalence and relevant factors of anti-hepatitis A virus antibody among general population in Baquba

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Background & Objective: Viral hepatitis is an important health concern in Iraq. Hepatitis A virus (HAV) is spread through contamination of water and food. The majority of infections occur during childhood. Both clinical and subclinical infection develops long-life circulating antibodies. The present study carried out to determine the seroprevalence of anti- HAV antibody among general population in Baquba city and to explore the effect of certain relevant factors.

Materials & Methods: The present study was conducted for the period from 30/September/2004 to 30/Augest/ 2005. 142 blood samples were collected from apparently healthy individuals. Sera were separated and kept at -20 ^{0}C till examined. Furthermore, 81 blood samples collected from domesticated farm animals were also included. Detection of anti-HAV IgG was done by enzyme-linked immunosorbant assay (ELISA). Data were statistically analyzed.

Results: The seroprevalence of anti-HAV IgG among apparently healthy individuals in Baquba was 73.2%.The infection rate was statistically higher in those < 15 years old (P<0.001) with an Odd ratio 7.6 times more compared to other age groups. Additionally, the infection rate among rural was significantly higher (P= 0.008) with an Odd ratio 3.5 times compared to urban. However, the effect of other factors was statistically insignificant. The seroprevalence of anti-HAV IgG among cows, sheep and goats were 22.2%, 18.2%and 21.8% respectively.

Conclusion: The seroprevalence of anti-HAV IgG among healthy population in Baquba was comparable to that in other endemic areas and that domesticated animals may act as reservoirs for disseminating the virus in the community.

Key words: seroprevalence, HAV, Baquba.

Introduction:

Hepatitis A is an acute, usually self-limited disease of the liver caused by hepatitis A virus (HAV) [1]. HAV is a single-stranded RNA non-enveloped virus with a diameter of 27nm; it is belonging to the family of picornaviridae, genus hepatovirus [2]. The virus has worldwide distribution and caused about 1.5 million cases of clinical hepatitis globally [3]. HA is a feco-orally transmitted infection which has become relatively low in industrialized countries due to high standard of hygiene [4]. However, it is highly endemic in many developing countries in which the infection is acquired mainly during early childhood [5, 6]. The incidence of clinical symptoms increases with age; after 10 years of age the illness occurs in more than 80% [7, 8]. To date, chronic hepatitis A with persistent has not been documented [9, 10]. HAV is relatively more resistant to heat and other environmental conditions than other picornaviruses [11].

Because only one single serotype is known of this virus, it has been one of the most easily and reliable diagnosable viral infection [12]. The diagnosis of recent infection and the detection of immunity to HAV are based mainly on the detection of anti-HAV antibodies [13].

Materials & Methods:

The present study was conducted for the period from 30/September/2004 to 30/Augest/ 2005 in Baquba city. 142 apparently healthy individuals from those attending the Central Blood Bank in Public Health Laboratory for blood donation and those co-attending with their relatives to primary health care centers in Baquba were included. Blood samples were collected by vein puncture using disposable syringes and plane test tubes. The mean age was 22.8 ± 14.5 years. 74 (52.12%) were females with mean age 23.4 ± 14.4 years and 68 (47.9%) were males with mean age 22.4 ± 14.6 years. Furthermore, 81 blood samples collected from domesticated animals (using the jugular vein), including 32 goats, 22 sheep, and 27cows. Sera were separated and kept at -20 ^{0}C till examined Detection of anti-HAV IgG was done by enzyme-linked immunosorbant assay (ELISA) following the manufacturer's instructions. All data were statistically analyzed.

Results:

The results showed that the seroprevalence of anti-HAV IgG among apparently healthy individuals in Baquba city was (73.2%), as 104 out of 142 individuals were positive. Additionally, the seroprevalence of anti-HAV IgG was significantly higher (P<0.001) among those less than 15 years old, with a 95% confidence interval (CI) range between 2.7-21.1. The Odd ratio in this age group was 7.6 times more compared to other age groups, **table (1).**

Table (1): Seroprevalence of anti-HAV IgG according to age.

Age Groups (Ys)	Anti-HAV IgG						Odd ratio	95% CI of Odd ratio
	Positive		Negative		Total			
	No.	%	No.	%	No.	%		
< 15	43	86	7	14	50	100	7.6	2.7-21.1
15-24	29	85.3	5	14.7	34	100	7.2	2.3-22.5
25-34	15	75	5	25	20	100	3.7	1.1-12.3
35 +	17	44.7	21	55.3	38	100	**Reference**	
Total	104	73.2	38	26.8	142	100		

P< 0.001

Table (2) revealed that the seroprevalence of anti-HAV IgG was insignificantly higher in females compared to males (78.4% vs. 67.6%).

The seroprevalence of anti-HAV IgG among those reside rural areas was significantly higher than that in those reside the urban areas (87.2%vs 66.3%). The Odd ratio among rurals was 3.5 times more compared to urbans, and the 95% CI 0f the Odd ratio range between 0.9-1.3),**table (3).**

Table (2): Seroprevalence of anti-HAV IgG according to gender.

Gender	Anti-HAV IgG						Odd ratio	95% CI of Odd ratio
	Positive		Negative		Total			
	No.	%	No.	%	No.	%		
Female	58	78.4	16	21.6	74	100	1.7	0.8-3.7
Male	45	57.6	22	32.4	68	100	**Reference**	

P=0. 15

Table (3): Seroprevalence of anti-HAV IgG according to residence.

Gender	Anti-HAV IgG						Odd ratio	95% CI of Odd ratio
	Positive		Negative		Total			
	No.	%	No.	%	No.	%		
Rural	41	87.2	6	12.8	47	100	3.5	0.9-1.3
Urban	53	66.3	32	33.7	95	100	**Reference**	

P=0.008

The seroprevalence of anti-HAV IgG among those using rivers and wells for drinking water was (87.5%), while that among those using municipal water was (71.4%), and although the odd ratio in the first group was 2.8 times more compared to the second group, the difference was statistically insignificant, **table(4).**

The seroprevalence of anti-HAV IgG among those people who breeds farm animals indoor was (74.2%), while the seroprevalence among those who denied any contact with farm animals was 73%). The difference between the two groups was statistically insignificant, **table (5).**

The seroprevalence of anti-HAV IgM among domesticated farm animals was 22.2% among cows, 21.8% among goats, and 18.2% among sheep, **table (6).**

Table (4): Seroprevalence of anti-HAV IgG according to the source of drinking water.

Source of water	Anti-HAV IgG						Odd ratio	95% CI of Odd ratio
	Positive		Negative		Total			
	No.	%	No.	%	No.	%		
Rivers, wells	14	87.5	2	12.5	16	100	2.8	0.6-12.9
Municipal	90	71.4	36	28.6	126	100	**Reference**	

P=0.24

Table (5): Seroprevalence of anti-HAV IgG according to contact with farm animal.

Contact	Anti-HAV IgG						Odd ratio	95% CI of Odd ratio
	Positive		Negative		Total			
	No.	%	No.	%	No.	%		
No	81	73	30	27	111	100	1.1	
Yes	23	74.2	8	25.8	31	100	Reference	

P=0.89

Table (6): seroprevalence of anti-HAV IgG among domesticated farm animals

Farm animals	No. examined	No. positive	%
Sheep	22	4	18.2
Goats	32	7	21.8
Cows	27	6	22.2

Discussion:

The seroprevalence of anti-HAV IgG among apparently healthy individuals in Baquba city is less than the (95%) obtained by a study carried out in mid 1980s in Baghdad [14]. The difference between these results may be related to the lifestyle of the population under study, as the population crowdness in Baghdad is usually higher. Furthermore, during the time difference between these studies, certain improvement in personal as well as community health knowledge can be assumed. However, in either case these results are compatible with those in other endemic countries, such as Brazil (87%), Turkey (87.4%), and India (94.6%) [11, 13, 15]. On the contrast, our results is higher as compared to those reported in low endemic countries, such as Japan (2%), Sweden (13%), and France (16.5%) [1, 16, 17].

In Baquba, and probably other Iraqi cities, these results are not unusual, since poor health education, absence of proper sewage disposal, and shortage of safe water supply is common.

Almost all studies are in agreement with ours in that the majority of HAV infection occurs during childhood [6, 18, and 19]. In India, the seroprevalence of anti-HAV IgG among children 12 years old was 96.6% [15]. In Tunisia, the seroprevalence among children 10-15 years old was 58% [20]. While it was 52.4% among those 11-14 years old in Turkey [21] The present study affirm that children are becoming highly vulnerable to HAV infection as the passively acquired maternal antibodies has been fade up after the first year of life [22].

It is worthy to mention that in endemic areas, the persistence of these antibodies in the serum for decades or even the whole life may e due to recurrent subclinical infections that continuously boosting the immune response and thus a protective titers of these antibodies can be maintained [23,24].

On the other hand, more than half of adults were negative for anti0HAV IgG and therefore they may be vulnerable for HAV infection again. In this regard, it has been reported that 27.4% of adults in Baquba with clinically evident acute hepatitis was due to HAV infection [25].

Since the majority of HAV infection occurs at the childhood, most previous studies found that both sexes were almost equally affected [6, 18].However, few studies reported a high seroprevalence in females compared to males [26].

The significantly higher seroprevalence of anti-HAV IgG in ruralees compared to urbanees is consistent with most previous studies [20, 27]. These results may be related to poor personal hygiene, absence of sewage disposal, unsafe water supply and presence of extended families [26].

Contamination of water supply with viral particles is the most important source of infection by HAV [5]. Contamination of ground water and wells is also reported [28]. A high contamination rate of rivers and wells occurs at the rainy season, because of the floods that carry the virus to the rivers and wells [29]. Additionally, HAV be more resistant to heat, acidic pH and the chlorine than other picornaviruses [1, 30]. Thus it can be assumed that what ever the sources of water supply, its contamination with viral particles is an important factor for dissemination of infection.

The finding that certain farm animals harbor anti-HAV IgG in their sera may point out to the possible role played by these animals in disseminating the virus in the community. Although certain laboratory animals were found to be susceptible to HAV infection with the shedding of the virus in their faces [31].However, no previous studies explore the susceptibility of farm animals to infection; therefore, we suggest further complementary studies concerning isolation of the virus or detection of its RNA in the faces by advanced molecular techniques.

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