Analyzing immunity against hepatitis A in 6-11 years old children in Kerman county

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ABSTRACT

Introduction: Hepatitis A is caused by a virus with a similar name. As a very contagious disease, Hepatitis A is one of the most prevalent infant infections across the developing countries. People who have been vaccinated and also those who caught this disease already are immune against hepatitis A. Since it was not possible and cost effective to analyze the immunity level of all asymptomatic children, in this study, the immunity level of some children against this virus was measured in order to estimate their immunity potential against this infection.

Methods: A total of 400 6-11 years old children in Kerman County, who have referred to the Be'sat Specialized Clinic and infants emergency care ward of Afzalipour Hospital and their blood have been collected for any reason except diagnosing hepatitis, were studied. Children with chronic liver, blood, immunity system deficiency and malignity were excluded from the study. Using ELISA technique and Dia-pro Milano Italy, made by Italy (with a sensitivity of 100% and specialty of 99.6%), their serum was analyzed in terms of anti-hepatitis data were analyzed using SPSS 16.

Results: 42.8% of children were immune against hepatitis A. 55% and 45% of children referred to the mentioned medical centers were girl and boy, respectively. 59.1% of boys and 40.9% of girls were immune, but there was not any significant difference between them. There was a direct relationship between immunity and children's age, as with increasing their age as large as 1 year their immunity level against hepatitis A is increased as large as 0.75%. There was not found any relationship between the immunity level and other demographic properties.

Conclusion: Most of 6-11 children are immune against hepatitis A because of their asymptomatic disease.

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Introduction:

Hepatitis A is the most prevalent viral hepatitis and accounts for majority cases of acute and benign hepatitis cases; however, it may also result in Fulminant hepatic failure. It is a rare case and is seen in adults more than in children. Hepatitis A infection is a worldwide disorder, but is more prevalent in the developing countries. Hepatitis A

virus is transmitted through personal contact and fecal-oral transmission (1).

Kindergarten epidemics (virus is transmitted from little children without jaundice) or Hepatitis A caused by polluted water and foods in the recent years have incentivized pervasive vaccination programs in the developing countries. Vaccination has decreased Hepatitis A cases considerably (1).

At the present time, vaccination against Hepatitis A is scheduled routinely in the developing countries, which it enjoys a very high immunity coverage (1). Two very immunogenic vaccines have an important effect in preventing Hepatitis A infection. Using both vaccines for above one year old children has been confirmed. Antibody test will become positive in 90% of cases after first vaccine and it will be positive in 100% of cases after the second vaccine (4).

Catching hepatitis A often occurs without jaundice and its symptoms, especially in little children cannot be differentiated from other forms of viral gastroenteritis. Prevalent symptoms of infection are fever, anorexia, nausea, fatigue, vomiting and jaundice which last 7 to 14 days. Acute pancreatitis, myocarditis, nephritis, vasculitis and cryoglobulinemia are other side effects and complications of this disease (1,2).

The acute hepatitis A infection is diagnosed by finding IgM antibody against the virus using radioimmunoassay technique. IgG antibody can be found within 8 weeks before commencement of symptoms and is the sign of long-term immunity and protection (3).

Symptomatic and supportive treatment is used for this disease. There is no special treatment for hepatitis A. A study on vaccinated children within 2003 to 2007 reported that the incidence rate of hepatitis A is 0% (5).

In Iran, few studies have been conducted about immunity against hepatitis A, as Dr. Abedian et al. (2012) in Savadkouh, Mazandaran, studied the relationship between immunity against hepatitis A and age in 1-30 years old people. In this study, 984 people were examined using ELISA method. Out of which 5.7% of subjects were 1-3 years old children, 34.8% were young adults and 68.4% were adults who had immunity against Hepatitis A (10).

Since analyzing immunity level of all children was not possible and cost effective and the immunity level of children in Kerman County is not clear, this study aimed that measuring immunity level of these children based on their age, gender, education level of their parents and habitat.

Methods:

A cross-sectional and descriptive method was used in this study. All 6-11 years old children in Kerman County who have referred to the Be'sat Specialized Clinic and infants emergency care ward of Afzalipour Hospital and their blood have been collected for any reason except diagnosing hepatitis constituted population of this study. Sample's size with immunity of 50%, precision of 5% and confidence of 95% was calculated 400 people.

Inclusion criteria: 6-11 years old children whose parents were consent. People with the experience of former hepatitis A vaccine and or background disease history including liver diseases and/or immune system deficiency and malignancy were excluded. There was not a clear description about former development of hepatitis A, which presumably was due to asymptomatic nature of the disease. The qualified children's parents were interviewed before sampling. Information was collected and recorded using a special form. 2 cc venous bloods were collected from all subjects and then for separating their serum they were transported to lab where they kept in -20°C. After collecting samples, serums were assessed with ELISA technique using Dia-pro Milano Italy, made by Italian Orgeneium Company (with sensitivity of 100% and specialty of 99.6%) for Ig G against HAV. The concentration of IgG was determined using a standard kit and if it was higher than the predefined standard, the subject was considered positive (immune) (titration above 1.1 was considered positive).

Statistical Analysis:

Data were analyzed using SPSS 16 Software. Central tendency and dispersion indexes were measured and their confidence domains were determined using binomial distribution. Chi-Squared test and t-test were used for fining the

potential relationships between immunity level and background variables.

In all stages of the study, results with $P \leq 0.05$ were considered significant statistically.

Results:

400 children were analyzed, out of which 220 people (55%) were girls and 180 people (45%) were boys. The average age of subjects was 8.46 ± 1.69, the youngest child was 6 years old and the oldest one was 11 years old. Out of total subjects participated in this study, 42.8% were immune against hepatitis A (the maximum titration of IgG: 11.6 and the minimum titration of IgG: 2.8) and 57.25 of subjects were not immune against hepatitis A (Table 1).

Table 1. Frequency distribution of subjects

Immunity level	Frequency	Percentage
Positive	171	42.8
Negative	229	57.2

* based on chi-squared test
Amounts are displayed as frequency percentage.

In this study, there was not any suspicious or relative immunity. Out of all subjects 55% were girls and 45% were boys. 59.1% of boys and 40.9%% of girls were immune; however there was not any significant difference between them. 30% of 7 years old children, 34% of 8 years old children, 38.4% of 9 years old children, 49.4% of 10 years old children, and 60% of 11 years old children were immune against hepatitis A, which it was a significant difference in age groups ($P < 0.01$).

The education levels of fathers of immune children were as follows: 9.9% had academic education, 64.3% had diploma, 24% had primary education and 1.8% were illiterate. Difference in education level was not significant statistically ($P < 0.09$).

The education levels of mothers of immune children were as follows: 11% had academic education, 67.8% had diploma, …% had primary education and 1.8% were illiterate ($P < 0.07$).

63.7% and 36.3% of the immune children lived in urban and suburban societies, respective. However, it was not a significant difference ($P = 0.487$). There was not any relationship between immunity to hepatitis A and families size ($P = 0.085$).

Table 2. Frequency distribution of immunity level in terms of age ranges

Immunity level	Total	P.V.	
Positive (n=171)	**Negative (n=229)**		
6-7 years old	221 (30)	49(70)	70
7-8 years old	25 (34)	49(66)	74
8-9 years old	35 (38.4)	56(61.6)	91
9-10 years old	42 (49.4)	43(50.6)	85 0.01<
10-11 years old	48 (60)	40(32)	80

* based on chi-squared test
Amounts are displayed as frequency percentage.

Conclusion:

The results showed that the immunity level of hepatitis A in 6-11 years old children in Kerman County is 42.8% which is roughly close to Zanjan (44.3%) (6) and Turkey's Ahatli (43.9%) (7,8) and is lower than Vietnam (97%) (8), Mongolia (90%) (9), and Bangladesh (74.8%) (11). This high level of immunity in this study is presumable due to the fact that people mostly develop the disease in pre-school ages which somehow declines worries about catching the disease and Fulminant hepatic failure in adulthood. It is necessary to explain that none of comparable countries with this study perform vaccination.

With increasing their age as large as 1 year their immunity level against hepatitis A is increased as large as 0.75%, because the personal contact is increased in the society with increasing age of patients.

There was not a significant relationship between children's immunity level and parents' education level; it is not expected that there is a relationship between education level and immunity level; however most parents of immune children had diploma degree. A similar study was not found to compare parents' education.

There is higher level of immunity in urban societies in contrast to suburban societies; however it was not a significant difference. Regarding the lower level of sanitary in suburban areas and higher potential of catching hepatitis A, it is expected that residents of suburban areas are more immune; however it must be considered that more personal contacts among children in urban areas, especially in kindergartens, justifies the potential of higher incidence. There was not a similar study on this regard.

Taking children and their parents' written consent and collecting blood samples from children were among constraints of the project.

With regard to the high immunity level resulted from this study in 6-11 years old children in Kerman County; it does not seem that Hepatitis A vaccine is among our health priorities for now.

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بررسی ایمنی نسبت به هپاتیت A در کودکان ۱۱-۶ ساله شهرستان کرمان

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چکیده

مقدمه: *هپاتیت A به علت ویروسی به همین نام ایجاد می‌شود. این بیماری یکی از شایع‌ترین عفونت‌های کودکی در کشورهای در حال توسعه می‌باشد که به شدت مسری است. افراد واکسینه شده و کسانی که قبلاً به بیماری مبتلا شده‌اند در مقابل بیماری هپاتیت A ایمن هستند. از آنجایی که امکان بررسی سطح ایمنی همه کودکانی که به صورت بی‌علامت مبتلا شده‌اند غیرممکن بوده و مقرون به صرفه نمی‌باشد، در این مطالعه سطح ایمنی تعدادی از کودکان بر علیه این ویروس اندازه‌گیری شده است تا وضعیت ایمنی کودکان نسبت به این عفونت تخمین زده شود.*

روش کار: *تعداد ۴۰۰ نفر از کودکان ۱۱-۶ساله شهرستان کرمان که در سال ۱۳۹۰ به کلینیک تخصصی بعثت و اورژانس اطفال بیمارستان افضلی‌پور مراجعه کرده و به عللی غیر از هپاتیت از آنها نمونه خون گرفته شد، مورد مطالعه قرار گرفتند. افرادی که بیماری مزمن کبدی، خونی و نقص سیستم ایمنی و بدخیمی و .. .داشتند، از مطالعه حذف شدند. سرم این افراد از نظر IgG ضد ویروس هپاتیت A به روش الیزا و به وسیله کیت Dia-pro milano Italy شرکت yvh Orgeneium از کشور ایتالیا (با حساسیت ۱۰۰٪ و ویژگی ۹۹/۶٪) بررسی و داده‌ها با استفاده از نرم‌افزار آماری SPSS 16 و آزمون کای –دو و t-test مورد تجزیه و تحلیل قرار گرفت.*

نتایج: *۴۲/۸ درصد کل مراجعه‌کنندگان نسبت به هپاتیت A دارای ایمنی بودند. از کل مراجعه‌کنندگان ۵۵ درصد دختر و ۴۵ درصد پسر بودند. ۵۹/۱ درصد پسرها و ۴۰/۹ درصد دختران ایمن بودند ولی اختلاف بین آنها معنی‌دار نبود. ایمنی با سن کودکان نسبت مستقیم داشت. به طوری که با افزایش هر یک سال سن، میزان ایمنی نسبت به هپاتیت A ۷۵٪ درصد بیشتر می‌شود. سطح ایمنی با سایر مشخصات دموگرافیک رابطه معنی‌داری نداشت.*

نتیجه‌گیری: *بسیاری از کودکان سنین ۱۱-۶ساله به علت ابتلا بدون علامت، نسبت به ویروس هپاتیت A ایمن هستند.*

کلیدواژه‌ها: *هپاتیت A- آنتی‌بادی –ایمنی - کودکان*

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