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INCIDENCE AND CHARACTERIZATION OF HEPATITIS A CASES IN THE STATE OF MINAS GERAIS

INCIDÊNCIA E CARACTERIZAÇÃO DOS CASOS DE HEPATITE A NO ESTADO DE MINAS GERAIS

INCIDENCIA Y CARACTERIZACIÓN DE LOS CASOS DE HEPATITIS A EN EL ESTADO DE MINAS GERAIS

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ABSTRACT

Objective: To analyze the incidence by gender and age group and characterize the cases of Hepatitis A in the state of Minas Gerais. **Methods:** A database of the Notifiable Diseases Information System (Sistema de Informação de Agravos de Notificação, SINAN) provided by the Minas Gerais State Health Secretariat for the year 2013 was used. A descriptive statistical analysis was performed. **Results:** The incidence was higher in females, and in almost all age groups. Contamination due to contaminated water and food, predominance of non-vaccinated cases for Hepatitis A, with diagnosis confirmed by laboratory examination and that evolved to acute hepatitis were highlighted. **Conclusion:** The incidence in the state is lower than the national, the cases have access to laboratory diagnosis, but vaccination campaigns for Hepatitis A should be optimized in order to increase vaccine coverage.

Descriptors: Hepatitis A; Incidence; Immunization; Vaccination.

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RESUMO
Objetivo: Analisar a incidência por sexo e faixa etária e caracterizar os casos de Hepatite A do estado de Minas Gerais. **Métodos:** Utilizou-se banco de dados do Sistema de Informação de Agravos de Notificação (SINAN), fornecidos pela Secretaria de Estado da Saúde de Minas Gerais, para o ano de 2013. Realizou-se análise estatística descritiva. **Resultados**: A incidência foi maior no sexo feminino e em quase todas as faixas etárias. Destacaram-se a contaminação por água e alimentos contaminados e o predomínio de casos não vacinados para Hepatite A, com diagnóstico confirmado por exame laboratorial e que evoluíram para hepatite aguda. **Conclusão:** A incidência no estado é menor que a nacional, os casos têm acesso ao diagnóstico laboratorial; porém, campanhas de vacinação para Hepatite A devem ser otimizadas com o intuito de aumentar a cobertura vacinal.
Descritores: Hepatite A; Incidência; Imunização; Vacinação.

RESUMEN
Objetivo: Analizar la incidencia por sexo y grupo etario y caracterizar los casos de Hepatitis A del estado de Minas Gerais. Métodos: Se utilizó una base de datos del Sistema de Información de Enfermedades Notificables (Sistema de Informação de Agravos de Notificação, SINAN) suministrada por la Secretaría de Salud del estado de Minas Gerais correspondiente al año 2013. Se realizó un análisis estadístico descriptivo. **Resultados:** La incidencia fue mayor en el sexo femenino, y en casi todas las edades. Se destacó la contaminación por agua y alimentos contaminados, y predominio de casos no vacunados para Hepatitis A, con diagnóstico confirmado por examen de laboratorio y que evolucionaron a hepatitis aguda. **Conclusión:** La incidencia en el estado es menor que la nacional, los casos tienen acceso al diagnóstico de laboratorio, pero las campañas de vacunación contra la Hepatitis A se deben optimizar con el objetivo de aumentar la cobertura de la vacunación.
Descriptores: Hepatitis A; Incidencia; Inmunización; Vacunación.

INTRODUCTION

Hepatitis A is one of the oldest diseases known to man, it has a high incidence and is a major public health problem in developing countries.[1] Transmission occurs through the Hepatitis A virus (HAV), mainly through fecal-oral form, contact with an infected person, or ingestion of contaminated water and food, particularly salads, fruits and bivalve mollusks. Infections, such as percutaneous and parenteral, have also been reported; but less frequently, due to the lower concentration of the A virus in the blood.[2]

Basic sanitation and health education are fundamental for reducing contagion of the disease. However, the prevention vaccine for Hepatitis A is the most effective way to reduce incidence rates in the short term, as improvements in socioeconomic and cultural issues are slow and take a long time to happen.[3]

Immunization for Hepatitis A was available at the Reference Centers for Special Immunobiologicals (Centros de Referência de Imunobiológicos Especiais, CRIE) for chronic patients with Hepatitis B and C, coagulopathies, cystic fibrosis, HIV, among

other diseases, and at private immunization clinics with the application of two doses at 12 and 18 months old. In 2014, this vaccine was introduced in the basic schedule of childhood vaccination with one dose at 15 months old. The Basic Health Unit is the appropriate place for treating the disease and receiving the vaccine.

According to the Pan American Health Organization (Organização Pan-Americana da Saúde, OPAS), it is estimated that 130 new cases of Hepatitis A per 100,000 inhabitants occur in Brazil.[4] However, an incidence rate of 0.6 cases per 100,000 inhabitants was observed in the country in 2016.[5] Monitoring incidence rates by age group is important to verify the effects of improved sanitation and/or the vaccine implementation.[6]

Regarding incidence, a study conducted in Brazil between 2004 and 2009 observed a low to intermediate endemicity in the country. In the age group of 5 to 19 years old, characterized by a transition phase between high and low epidemiological standards,[7] endemicity was intermediate (39.5%). Low endemicity for Hepatitis A can be mentioned when the overall incidence affects approximately 25% of the population where outbreaks are a frequent source. High endemicity, though, is considered when the global incidence reaches over 90%, commonly found in poor regions where most children under 10 years old have already been infected with the A virus.[8]

Viral hepatitis is included in the Ministry of Health's list of compulsory notification diseases (Ordinance No. 204 of February 17, 2016). Hepatitis cases must be registered in the Notifiable Diseases Information System (SINAN) to generate epidemiological information in order to assist in the planning and implementation of health actions in Brazil and to support the insertion of new vaccines in the National Immunization Program. To this end, health professionals should perform case records to enable monitoring of disease distribution and verify the predominantly affected population, in addition to detecting outbreaks and epidemics.[9] Failure to properly fill in the notification form can mask the real health situation of a population, leading to health interventions that are mistaken in relation to local needs.[10]

Considering the introduction of the vaccine in the basic schedule of childhood vaccination, the possibility of extending vaccination to other age groups and the small amount of national and regional studies on the epidemiological characterization and incidence of Hepatitis A, this study aimed to analyze the incidence of gender and age group and to characterize the cases in the state of

Minas Gerais related to clinical form, vaccination status, area of residence, schooling, skin color, source of contamination, diagnostic criteria, evolution and institutionalization of the case.

As there is a scarcity of scientific publications with similar objectives to this study, it is expected that the analysis may serve as guidance for public services to employ strategies in the prevention of Hepatitis A.

MATERIAL AND METHOD

This is a quantitative, ecological, and territorial based study conducted in the state of Minas Gerais. The population consisted of all cases of Hepatitis A reported to the SINAN, residing in the state of Minas Gerais, in 2013. The SINAN is an information system run by the Ministry of Health and implemented throughout the national territory in order to monitor compulsory notifications. The database was obtained from the State Health Department of Minas Gerais (Secretaria de Estado de Saúde de Minas Gerais, SES/MG) from the notification and investigation forms of viral hepatitis standardized by the Ministry of Health. The forms are filled by health professionals and then entered into the SINAN. The study was approved by the Research Ethics Committee of the Federal University of Triângulo Mineiro, under protocol No. 922.435.

The variables used in the study were clinical form, vaccination status, schooling, residence area, skin color, institutionalization, source of contamination, diagnostic criteria and case evolution. The verification of the quality of the variable's filling was based on the criteria proposed by the United Nations Economic Commission for Latin America and the Caribbean (Comissão Econômica para a América Latina e o Caribe, CEPAL), which considers the proportion of ignored information, blank fields and assigned codes as specified ignored information, characterized as incompleteness of information. The CEPAL classifies as excellent when there is less than 5% of incomplete information, good from 5% to 10%, regular from 10% to 20%, bad from 20% to 50% and very bad from 50% or over.[11,12]

Exploratory (descriptive) analyses of the data were performed based on the determination of absolute simple frequencies and percentages for categorical variables. Incidence rates (per 100,000 inhabitants) were calculated by age group and gender. Subsequently, the

gender ratio for the incidence by age group was calculated.

RESULTS

In 2013, 155 cases of Hepatitis A were reported in the state of Minas Gerais, which corresponds to 4.6% of the reported cases of viral hepatitis. In this year, there was a slight predominance in females 82 (52.9%), and a higher proportion of cases in the 5 to 9 year old age group (26.5%), followed by the 20 to 29 year old (14.8%) and the 10 to 14 year old (12.9%) groups. The average age was 22 years old and the median 13.0 years old. Most cases affected white skin people (33.5%), followed by brown (32.9%), lived in urban areas (72.3%) and had some schooling (40.6%). There was a predominance of non-institutionalized cases (45.2%); however, a considerable proportion of cases was observed in schools (24.5%).

Table 1 - Sociodemographic distribution of Hepatitis A cases, Minas Gerais, 2013.

Variables	N	%
Gender		
Female	82	52.9
Male	73	47.1
Race		
Caucasian	52	33.5
Brown-skinned	51	32.9
Unknown/White	41	26.4
Black	11	7.1
Age group		
Younger than 1 year old	03	1.9
1-4 years old	18	11.6
5-9 years old	41	26.5
10-14 years old	20	12.9
15-19 years old	06	3.9
20-29 years old	23	14.8
30-39 years old	09	5.8
40-49 years old	19	12.3
50-59 years old	07	4.5
60 years old and more	09	5.8
Schooling		
Some schooling	63	40.6
Unknown/White	50	32.2
Does not apply	41	26.5
Illiterate	01	0.7
Urban		
Area	112	72.3
Unknown/White	22	14.1
Rural	19	12.3
Peri-urban	02	1.3
Institutionalization		
Non-institutionalized	70	45.2
School	38	24.5
Unknown	23	14.8
Nursery	15	9.7
Hospital/Clinic	04	2.6
Others	03	1.9
Company	01	0.6

Prison	01	0.6

Regarding the clinical form, 89.7% of the cases evolved to acute hepatitis. Regarding the types of contamination, there was a predominance of contaminated water and food (54.8%), followed by contact with an infected person (7.1%). The diagnosis was confirmed in 76.1% of the cases by laboratory examination and in 23.2% by clinical-epidemiological bond. Only 1.9% had the complete Hepatitis A vaccination scheme, and those who were not vaccinated were predominant (56.8%), while the others ignored this information (35.5%).

Table 2 - Clinical characterization and vaccination status of Hepatitis A cases, Minas Gerais, 2013.

Variables	N	%
Clinical Form		
Acute Hepatitis	139	89.7
Chronic Hepatitis/Asymptomatic carrier	09	5.8
White	04	2.6
Fulminant Hepatitis	02	1.3
Inconclusive	01	0.6
Source		
Contaminated Water + Food	85	54.8
Unknown/White	44	28.4
Person/Person	11	7.1
Household	06	3.9
Others	06	3.9
Sexual	02	1.2
Transfusion	01	0.7
Final Classification		
Laboratory confirmation	118	76.1
Clinical-epidemiological confirmation	36	23.2
Serological scar	01	0.7
Excluded	00	0.0
Inconclusive	00	0.0
Vaccination for Hepatitis A		
Not vaccinated	88	56.8
Unknown	55	35.5
Incomplete	09	5.8
Complete	03	1.9

Incidence was higher in females compared to males in almost all age groups, especially between 5 and 9 years old. There was a higher incidence in males over the age of 60 years old and from 40 to 49 years old respectively, 9.69 and 2.88 times higher.

Table 3 - Distribution of the incidence of Hepatitis A (per 100,000 inhabitants) according to gender and gender ratio by age group, Minas Gerais, 2013.

Age group	Female incidence	Male incidence	Incidence Total	Gender ratio (M/F)*
0-4 years old	1.59	1.38	1.49	0.87
5-9 years old	3.47	1.91	2.67	0.55

10-14 years old	1.49	0.95	1.21	0.64
15-19 years old	0.61	0.12	0.36	0.19
20-29 years old	0.70	0.62	0.66	0.89
30-39 years old	0.36	0.18	0.27	0.49
40-49 years old	0.36	1.04	0.70	2.88
50-59 years old	0.35	0.27	0.31	0.79
60 years old and more	0.07	0.71	0.36	9.69
Total	0.79	0.71	0.75	0.90

*Acronym: M: Male; F: Female

Some variables had excellent completeness (> 95%) such as gender, age, final classification and clinical form; regular completeness (10 to 20%) such as institutionalization and area of residence; and poor completeness (with a high proportion of missing or blank data), such as skin color, schooling, vaccination status, and likely source of disease infection.

DISCUSSION

Hepatitis A has been presenting decreasing incidence rates. In Brazil, between 2003 and 2007, the incidence rate of Hepatitis A was higher than etiologies B and C, presenting a lower incidence rate decrease compared to Hepatitis B and C after 2007. In 2013, there was an incidence of approximately 2 cases per 100,000 inhabitants in the country, with the Southeast region presenting a rate of less than 1 case per 100,000 inhabitants; in contrast, the northern region was the one with most reported cases, 12 cases per 100,000 inhabitants. In the state of Minas Gerais, in 2016, the incidence rate of Hepatitis A was lower compared to the national.[5]

There were more reported cases in females, which corroborates the study conducted in Luziânia, Goiás, in 2009, with 57 people. However, a study conducted in the country between 2003 and 2006 showed a slight predominance of males, with a higher gender ratio in relation to this study in the period.[5,13] These results demonstrate that gender may not be a risk factor for A virus infection. Moreover, when analyzing the incidence in this study, there was predominance in almost all age groups for females. In contrast, the incidence rate in 2013 in Brazil was higher in males, indicating that gender, as a risk factor for Hepatitis A, should be studied in greater depth.[5]

Most of the reported cases were in white skinned people; however, there was a large percentage of unknown information related to this aspect. This data incompleteness and the predominance in the white race were also found in a survey conducted in the Southeast region of Brazil in 2010; another study conducted in 2016

showed that the majority of those notified in the country for the disease declared themselves to be brown, (54.5%).[5,7] The predominant age group of Hepatitis A virus infection was between 5 and 9 years old, which was also evidenced in a study conducted in the Brazilian Western Amazonia, in 2011, and in the country between 2003 and 2016, where the incidence rate in children under 10 years old was considerably higher compared to the other age groups.[14,5]

There are important steps in the epidemiological investigation aiming at identifying incidence, source of transmission, mode of transmission, exposed groups, risk factors, confirmation of the diagnosis and determination of the epidemiological characteristics of the disease so that the data can be recorded in the Health Information Systems with consistency and completeness. For this purpose, there is a need to train the health professionals to properly fill the investigation/notification form of the disease, in order to expand the use in conducting research and developing strategies for the disease reduction in the country. Regarding the incompleteness of the data, the poorly filled vaccine situation could compromise the identification of the impact of vaccination on the disease in the state. Failure to timely identifying the source of infection compromises the design of prevention strategies and incomplete schooling information impairs knowledge about the lack of access to information and prevention.

Developed and developing countries have later exposure of their population to Hepatitis A due to improvements in health conditions.[15] The hygienic and social improvements of the most economically favored class make contact/infection with the virus at an older age, among adolescents and adults. In this age group, higher morbidity and lethality rates associated with Hepatitis A are observed, indicating that the symptoms are more evident.[3] Due to these sanitary and social improvements, it was observed that there is a change in the epidemiological profile of Hepatitis A.[16] This change can be observed in the following comparison: in 2006, the incidence rates per 100,000 inhabitants according to age groups were the following: for children under 5 years old (17.5 cases), 5-9 years old (35.8 cases), 10-14 years old (18.2 cases) and 15-19 years old (7.4 cases). In 2015, for the same age groups, the incidence rates were 2.7 cases; 5.1 cases; 3.3 cases and 1.9 cases, respectively.[16] A similar phenomenon occurs in the United States, where incidence rates for the A virus were 6.0 cases per 100,000 inhabitants in 1999, with a reduction to 0.4 cases per 100,000 in 2011.[17]

No studies addressing the literacy level of the infected people were found for comparison. In this research, the vast majority of cases had some schooling. The higher the education level, the greater the access to information and better living and health conditions; thus, being a generic protection factor. Positivity for anti-HAV IgG in children increases proportionally with the lower levels of parental schooling, which may show lack of health and hygiene information.[15]

Hepatitis A is frequent in epidemic outbreaks, usually in clusters of institutionalized people such as schools, nurseries, barracks, hospitals, orphanages and mental institutions. This is due to the oral-fecal transmission nature of the A virus and to the agglomeration of people sharing the same bathroom and sleeping in the same bedroom. This problem tends to decrease with improvements in sanitation conditions and better hygiene habits in human settlements.[4] In a study conducted in Luziânia, Goiás, in 2009, transmission by previous contact with people infected with the A virus was 28%.[13] Contaminated water and food is the most common source of infection; however, in 2017, in São Paulo, there was a 960% increase in the number of cases of Hepatitis A compared to 2016, with 80% of reported males aged 18-39 years old and having unprotected sexual contact as source of infection (45%).[18] In this study, most cases were laboratory confirmed, in which anti-HAV IgM was reactive, which was also observed in the study conducted in Goiás.[13]

This study has found that most of the infected individuals developed acute hepatitis; however, there were nine cases of chronic/asymptomatic Hepatitis A carriers. There are no reports in the literature of chronic hepatitis due to the A virus until now; chronification may occur in patients who become infected with hepatitis B, C, and D virus.[4] Hepatitis A may develop asymptomatically in children, but in young and old adults this infection may be symptomatic with 1.8% in individuals over 50 years old with fulminant hepatitis, a complication that may be common in people without previous contact with the virus or infected people. Between 10 and 20% of liver transplants in children performed in Brazil are caused by fulminant hepatitis by the A virus.[15] In the southern region of the country, from 1995-2006, 39% of hospitalizations in children were caused by fulminant Hepatitis A and 69% have died.[14] In a survey conducted in Brazil, during 2000-2015, regarding deaths due to viral hepatitis, it was found that 1.7% were caused by Hepatitis A.[5]

The vast majority of reported cases were unvaccinated, having as its probable cause the lack of universal distribution of the vaccine. It has high immunogenic power

in healthy people, with serum antibody levels remaining high for long periods after immunization.[19] With the introduction of the vaccine in the National Immunization Program, a reduction of 64% in the number of cases of jaundice and 59% of deaths caused by the A virus is expected, with a cost of US$ 7.23 per dose.[14] The Hepatitis A vaccine tends to be very favorable because, with the socioeconomic and hygiene conditions improvements, there is an increase in people susceptible to the virus, which means that infection in adults and elderly people and severe forms of the disease may occur.[20]

As a limitation of the study, we highlight the use of a secondary data source, which restricts the variables of interest to the SINAN standardized collection form and may present incompleteness in the data record.

CONCLUSION

In this study, from the investigation/notification form of the disease, the conclusion was that incidence was higher in females, aged 5-9 years old, white skinned, urban residents, non-institutionalized, with evolution to acute hepatitis, contamination by water and food, diagnosed in the laboratory and not vaccinated. The incidence rate of Hepatitis A in the state of Minas Gerais was lower than the national. It is necessary to optimize basic sanitation strategies, health education and the National Immunization Program for the prevention of the disease. Vaccination is the faster way to combat the disease. Thus, vaccination campaigns against Hepatitis A would be appropriate, especially in the age group between 5 and 9 years old for the non-vaccinated, since they were the most affected. Studies on the impact of vaccination on the incidence of Hepatitis A should be performed later in order to verify the reduction of cases, hospitalizations and deaths in the state of Minas Gerais.

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