Hepatitis A in Greater Florianópolis: analysis of the profile of cases and epidemiological indicators, 2023–2024

Hepatite A na Grande Florianópolis: análise do perfil dos casos e dos indicadores epidemiológicos em 2023–2024

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ABSTRACT

Introduction: Despite improvements in sanitation and the introduction of the hepatitis A vaccine, sporadic outbreaks still occur in some regions of Brazil. Analysis of epidemiological indicators of hepatitis A in Greater Florianópolis allows for a more detailed understanding of the disease's characteristics in the local population, enabling the identification of more vulnerable groups and supporting targeted prevention and control strategies. **Objective:** To analyze the profile of cases and epidemiological indicators of hepatitis A in Greater Florianópolis during the period of 2023–2024. **Methods:** This is a descriptive study that analyzed confirmed cases of hepatitis A in Greater Florianópolis in 2023 and 2024. The profile was examined based on absolute and relative frequencies, accompanied by the calculation of incidence rates and sex ratios. Furthermore, Pearson's chi-square and Fisher's exact tests were used to examine differences in proportions. **Results:** There were 305 cases of hepatitis A registered. A higher frequency of notifications was observed in males (84.6%), in the age group of 20 to 39 years (79.3%), and in people with more schooling (45.9% with complete or incomplete higher education). The incidence of hepatitis A in Florianópolis was 35.0/100,000 inhabitants in 2023. Males showed a higher proportion of probable sexual transmission (66.8%) compared to females (25.0%), while females were more affected by contaminated water or food (75.0%) ($p<0.001$). Sexual transmission was more frequent in individuals with higher education (66.7%), while ingestion of contaminated water or food prevailed among those with primary education (28.6%) ($p=0.017$). **Conclusion:** The analysis of hepatitis A cases in Greater Florianópolis highlighted important differences in the epidemiological profile, with a higher frequency of cases in young, educated men, as well as distinct associations between transmission routes and sociodemographic factors, highlighting the need for specific prevention and control strategies.
Keywords: hepatitis A. hepatitis A virus. disease outbreaks. health information systems.

RESUMO

Introdução: Apesar dos avanços nas condições sanitárias e da introdução da vacina contra a hepatite A, surtos esporádicos ainda ocorrem em algumas regiões do Brasil. A análise dos indicadores epidemiológicos da hepatite A na Grande Florianópolis permitirá uma compreensão mais detalhada das características da doença na população local, possibilitando a identificação de grupos mais vulneráveis e subsidiando estratégias direcionadas de prevenção e controle. **Objetivo:** Analisar o perfil dos casos e os indicadores epidemiológicos da Hepatite A na Grande Florianópolis no período de 2023-2024. **Métodos:** Estudo descritivo que analisou casos confirmados de hepatite A na Grande Florianópolis em 2023 e 2024. O perfil foi examinado com base em frequências absolutas e relativas, acompanhadas do cálculo das taxas de incidência e da razão de sexos. Ainda, utilizaram-se os testes qui-quadrado de Pearson e exato de Fisher para examinar diferenças de proporções. **Resultados:** Foram registrados 305 casos de hepatite A. Observou-se maior frequência de notificações no sexo masculino (84,6%), na faixa etária de 20 a 39 anos (79,3%) e em pessoas mais escolarizadas (45,9% em pessoas com ensino superior completo ou incompleto). A incidência de hepatite A em Florianópolis foi de 35,0/100.000 habitantes em 2023. O sexo masculino apresentou maior proporção de provável fonte sexual (66,8%) em relação às mulheres (25,0%), enquanto mulheres foram mais afetadas por água ou alimento contaminado (75,0%) ($p<0,001$). A via sexual foi mais frequente em indivíduos com ensino superior (66,7%), enquanto a ingestão de água ou alimentos contaminados prevaleceu entre aqueles com ensino fundamental (28,6%) ($p=0,017$). **Conclusão:** A análise dos casos de hepatite A na Grande Florianópolis destacou diferenças importantes no perfil epidemiológico, com maior frequência de casos em homens jovens e escolarizados, além de associações distintas entre vias de transmissão e fatores sociodemográficos, evidenciando a necessidade de estratégias específicas de prevenção e controle.
Palavras-chave: hepatite A. vírus da hepatite A. surtos de doenças. sistemas de informação em saúde.

INTRODUCTION

Hepatitis A, also known as "infectious hepatitis", is a transmissible disease caused by the hepatitis A virus (HAV)[1]. It is a self-limiting, non-chronic disease, with vaccination as the main control measure[2]. Its incubation period ranges from 15 to 50 days, and it is symptomatic in about 70% of adults. It initially manifests with symptoms such as nausea, vomiting, fever, malaise, and abdominal pain, followed by jaundice, dark urine, pale stools, and itching[2].

The main route of transmission of the hepatitis A virus is fecal-oral contact, as well as the consumption of contaminated water and food[3]. However, there are increasing records of sexual transmission, especially among men who have sex with men, which highlights the need to intensify preventive actions throughout the territory[4].

A detailed study on global trends in hepatitis A incidence and mortality, conducted between 1990 and 2019, revealed a 13.9% increase in cases of the disease worldwide, with the number of cases rising from 139.54 million in 1990 to 158.94 million in 2019. Furthermore, the age-standardized incidence rate increased in low and lower-middle sociodemographic index regions[5].

In Brazil, despite improvements in sanitation and the introduction of the vaccine, hepatitis A remains endemic, and outbreaks can occur in some regions[6]. Between 2000 and 2023, the Northeast (29.7%) and North (25.0%) regions accounted for more than half of

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confirmed cases of hepatitis A in the country[7]. In contrast, in 2023, when classifying the incidence rates of hepatitis A in Brazilian capitals, it was observed that seven of them presented rates higher than the national average (1.0 case per 100,000 inhabitants), especially in Florianópolis (about 36 cases per 100,000 inhabitants)[7].

In September 2023, the Secretaria de Estado da Saúde de Santa Catarina (SES), in partnership with the Diretoria de Vigilância Epidemiológica (DIVE) and the Laboratório Central de Saúde Pública (LACEN), issued a joint statement warning about the increase in reported cases of hepatitis A in Florianópolis[4]. The statement emphasized the importance of guidance on the disease, as well as surveillance actions, epidemiological investigation and sample collection for diagnosis[4].

The analysis of epidemiological indicators of hepatitis A in the Greater Florianópolis region provides a detailed understanding of the disease's characteristics in the local population, allowing for the identification of more vulnerable groups. Furthermore, this data can help strengthen public health policies, making them more effective and targeted, ensuring the appropriate allocation of resources and the implementation of control strategies aimed at reducing virus transmission. By providing up-to-date data, this study becomes an essential tool for health professionals, researchers, and managers, contributing to the strengthening of collective knowledge about hepatitis A and its epidemiological dynamics.

OBJECTIVE

The objective of this study was to analyze the case profile and epidemiological indicators of hepatitis A in Greater Florianópolis during the period of 2023–2024.

METHODS

Study design and data source

This is a descriptive study of confirmed cases of hepatitis A in the Greater Florianópolis region, in Santa Catarina, covering the years 2023 and 2024. The data were obtained from the Notifiable Diseases Information System (SINAN) and covered the period from January 1, 2023 to October 31, 2024.

For the calculation of the epidemiological indicators in this study, population data from the Brazilian Institute of Geography and Statistics (IBGE), accessed through the TABNET platform provided by the Department of Informatics of the Unified Health System (DATASUS), were also used.

The Greater Florianópolis health macro-region, the focus of this analysis, occupies a total area of approximately 7,114.1 km² and encompasses 22 municipalities. In 2022, the estimated population of the entire territory was 1,356,861 inhabitants.

Inclusion criteria

Only confirmed cases of hepatitis A in the Greater Florianópolis region were included, within the previously specified period, with confirmation carried out according to criteria established by information note no. 55/2019-CGAE/DIAHV/SVS/MS[8], which provides guidance on case definition criteria for reporting viral hepatitis.

Variables

Sociodemographic variables were analyzed, including: sex (male; female), age group (≤14; 15–19; 20–29; 30–39; 40–49; 50–59; ≥60 years), race/skin color (white; black; yellow; brown; indigenous; unknown), education level (incomplete primary; complete primary; incomplete secondary; complete secondary; incomplete higher education; complete higher education; unknown; not applicable), city of residence in the Greater Florianópolis region (Antônio Carlos; Biguaçu; Florianópolis; Governador Celso Ramos; Palhoça; São José — cities where cases were registered), year of notification (2023; 2024), and patient institutionalization status (school; nursing home; company; hospital/clinic; other; not institutionalized; unknown).

In addition, variables related to health conditions and contact/exposure history were analyzed, including: associated condition (HIV/AIDS or other STIs) (yes; no; unknown), final case classification (laboratory confirmation; clinical-epidemiological confirmation), and probable source or mechanism of infection, including categories such as sexual; drug use; household; dental treatment; person-to-person contact; ingestion of contaminated food/water; other; and unknown.

Data analysis

Qualitative variables were described using absolute (n) and relative (%) frequencies for each category. To analyze the difference between the sample characteristics, specifically according to the source of transmission via sexual route or through ingestion of contaminated water/food, Pearson's chi-square test was used. When the test assumptions were not met, Fisher's exact test was used. When an association was found, the difference between categories was investigated using adjusted standardized residuals, whose value above 1.96 standard deviations indicated the cells with differences between the percentages.

The monthly incidence rate was calculated by dividing the number of confirmed cases each month by the total resident population in the same period and location, multiplying the result by 100,000. The incidence rate by city was calculated by dividing the number of confirmed cases in each city by the total resident population in the respective municipality during the analyzed period, and subsequently multiplying the result by 100,000. In addition, the sex ratio was evaluated, determined based on the number of confirmed cases of hepatitis A in males in a given year of notification and place of residence divided by the number of confirmed cases of hepatitis A in females in the same year of notification and place of residence. The spatial distribution of incidence rates by region of Greater Florianópolis was carried out with the aid of the Datawrapper website.

The analyses were conducted using the Stata software, version 14. For the bivariate analyses, a significance level of 5% ($p<0.05$) was considered.

Ethical Aspects

The data were analyzed in an anonymized manner, without any identification of the participants. Thus, since these are public domain data with no personal identification, it was not necessary to submit them for ethical review, in accordance with Resolution No. 674, of May 6, 2022 (Article 26, Sections III and V)[9].

RESULTS

Between January 1, 2023 and October 31, 2024, 305 confirmed cases of hepatitis A were recorded in the Greater Florianópolis region, of which 220 occurred in 2023 and 85 in 2024. Considering the full analysis period, a higher frequency of cases was observed in males (84.6%), in the 20–39 age group (79.3%), and among individuals who self-identified as White race/color (83.0%). Regarding education level, nearly half of the cases had completed or were attending higher education (45.9%). Florianópolis stood out as the city with the highest number of notifications, covering 83.6% confirmed cases (**Table 1**).

Table 1. Sociodemographic profile description of confirmed cases of hepatitis A in the Greater Florianópolis, Santa Catarina, 2023–2024.

Variable	2023		2024		Total	
	n	%	n	%	n	%
Sex						
Male	184	83.6	74	87.1	258	84.6
Female	36	16.4	11	12.9	47	15.4
Age range (years)						
≤14	1	0.5	-	-	1	0.3
15–19	4	1.8	4	4.7	8	2.6
20–29	85	38.6	38	44.7	123	40.3
30–39	95	43.2	24	28.2	119	39.0
40–49	27	12.3	14	16.5	41	13.5
50–59	5	2.3	1	1.2	6	2.0
≥60	3	1.3	4	4.7	7	2.3
Race/skin color						
White	187	85.0	66	77.7	253	83.0
Black	6	2.7	2	2.3	8	2.6
Yellow	6	2.7	5	5.9	11	3.6
Brown	13	5.9	8	9.4	21	6.9
Native	1	0.5	-	-	1	0.3
Ignored	7	3.2	4	4.7	11	3.6
Education (years)						
Incomplete primary education	6	2.7	7	8.2	13	4.3
Complete elementary education	7	3.2	1	1.2	8	2.6
Incomplete middle school education	9	4.1	2	2.3	11	3.6
Complete middle school education	66	30.0	23	27.1	89	29.2
Incomplete higher education	26	11.8	12	14.1	38	12.5
Complete higher education	72	32.7	30	35.3	102	33.4
Ignored	33	15.0	10	11.8	43	14.1
Not applicable	1	0.5	-	-	1	0.3
City of residence						
Antônio Carlos	1	0.4	-	-	1	0.4
Biguaçu	-	-	4	4.7	4	1.3
Florianópolis	188	85.5	67	78.8	255	83.6
Governor Celso Ramos	3	1.4	1	1.2	4	1.3
Hut	7	3.2	5	5.9	12	3.9
São José	21	9.5	8	9.4	29	9.5
Total	**220**	**100**	**85**	**100**	**305**	**100**

Source: SINAN/GEDIC/DIVE/SUV/SES.
The 2024 data are partial, extracted on 10/31/2024; Hepatitis A cases confirmed according to laboratory criteria (anti-HAV IgM reactive) or clinical-epidemiological criteria.

Among individuals reported with hepatitis A, 19.3% presented with co-infection with human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), with 19.5% of cases in 2023 and 18.8% in 2024. Furthermore, 11.8% of notifications during the period registered other associated sexually transmitted infections (STIs). A higher proportion of non institutionalized individuals (88.5%) were observed, followed by those from hospitals or clinics (4.3%). Regarding the final classification, most cases were confirmed by laboratory tests (98.0%), while the clinical-epidemiological criterion was used in 2.0% of cases (**Table 2**).

Table 3 presents the analysis of the association between sociodemographic characteristics and health conditions and the probable source or mechanism of infection (sexual versus contaminated water/food).

Table 2. Description of the presence of associated complications, institutionalization, final classification, and probable source or mechanism of infection of confirmed cases of hepatitis A in the Greater Florianópolis region, Santa Catarina, 2023–2024.

Variable	2023		2024		Total	
	n	%	n	%	n	%
Associated aggravation: HIV/AIDS						
Yes	43	19.5	16	18.8	59	19.3
No	159	72.3	66	77.7	225	73.8
Ignored	18	8.2	3	3.5	21	6.9
Associated aggravation: other STIs						
Yes	29	13.2	7	8.2	36	11.8
No	169	76.8	74	87.1	243	79.7
Ignored	22	10.0	4	4.7	26	8.5
Institutionalized						
School	1	0.5	-	-	1	0.3
Asylum	-	-	1	1.2	1	0.3
Company	1	0.5	-	-	1	0.3
Hospital/Clinic	8	3.6	5	5.9	13	4.3
Others	4	1.8	2	2.3	6	2.0
Not institutionalized	195	88.6	75	88.2	270	88.5
Ignored	11	5.0	2	2.4	13	4.3
Final classification						
Laboratory confirmation	218	99.1	81	95.3	299	98.0
Clinical-epidemiological confirmation	2	0.9	4	4.7	6	2.0
Probable source or mechanism of infection						
Sexual	109	49.5	43	50.6	152	49.8
Drug use	1	0.5	1	1.2	2	0.7
Home-based	3	1.4	-	-	3	1.0
Dental treatment	1	0.5	1	1,2	2	0.7
Person/person	2	0.9	-	-	2	0.7
Contaminated food/water	78	35.4	20	23.5	98	32.1
Other	8	3.6	2	2.3	10	3.2
Ignored	18	8.2	18	21.2	36	11.8
Total	**220**	**100**	**85**	**100**	**305**	**100**

Source: SINAN/GEDIC/DIVE/SUV/SES.
HIV: Human immunodeficiency virus; AIDS: acquired immunodeficiency syndrome; STIs: sexually transmitted infections.
2024 data are partial, extracted on 10/31/2024; Hepatitis A cases confirmed according to laboratory criteria (anti-HAV IgM reactive) or clinical-epidemiological criteria.

Table 3. Bivariate analysis of sociodemographic characteristics and health conditions of confirmed cases of hepatitis A, according to the probable source or mechanism of infection (sexual versus contaminated food/water), in the Greater Florianópolis region, Santa Catarina, from 2023–2024 (n=250).

Probable source or mechanism of infection**	Sexual (n=152)		Contaminated food/water (n=98)		p-value
Variable	**n**	**%**	**n**	**%**	
Sex					**<0.001[a]**
Male	143	66.8*	71	33.2*	
Female	9	25.0*	27	75.0*	
Age group (years)					0.326[b]
≤14	-	-	1	100.0	
15–19	2	50.0	2	50.0	
20–29	56	57.1	42	42.9	
30–39	69	67.0	34	33.0	
40–49	18	54.5	15	45.5	
50–59	5	83.3	1	16.7	
≥60	2	40.0	3	60.0	
Race/Skin color					0.395[b]
White	127	60.2	84	39.8	
Black	3	42.9	4	57.1	
Yellow	7	87.5	1	12.5	
Mixed	8	57.1	6	42.9	
Indigenous	1	100.0	-	-	
Education level					0.073
Incomplete elementary school	2	33.3	4	66.7	
Complete elementary school	2	25.0	6	75.0	
Incomplete high school	4	44.4	5	55.6	
Complete high school	41	59.4	28	40.6	
Incomplete higher education	23	74.2	8	25.8	
Complete higher education	59	64.1	33	35.9	
Education					**0.017[a]**
Elementary (incomplete or complete)	4	28.6*	10	71.4*	
High school (incomplete or complete)	45	57.7	33	42.3	
Higher education (incomplete or complete)	82	66.7*	41	33.3*	
City of residence					**0.005[b]**
Antônio Carlos	-	-	-	-	
Biguaçu	1	100.0	-	-	
Florianópolis	144	63.7*	82	36.3*	
Governador Celso Ramos	1	100.0	-	-	
Palhoça	2	25.0*	6	75.0*	
São José	4	28.6*	10	71.4*	
Associated conditions: HIV/AIDS					**<0.001[a]**
Yes	42	82.4*	9	17.6*	
No	99	53.2*	87	46.8*	
Associated conditions: other STIs					**0.021[a]**
Yes	25	78.1*	7	21.9*	
No	113	56.5*	87	43.5*	

Source: SINAN/GEDIC/DIVE/SUV/SES.
HIV: Human immunodeficiency virus; AIDS: acquired immunodeficiency syndrome; STIs: sexually transmitted infections; **Missed/ignored data were excluded from the bivariate analysis; *Differences identified by adjusted standardized residuals.
[a]Pearson's chi-square test; [b]Fisher's exact test.
2024 data are partial, extracted on 10/31/2024; Confirmed Hepatitis A cases according to laboratory criteria (anti-HAV IgM reactive) or clinical-epidemiological criteria.

A higher proportion of probable sexual source was observed in men (66.8%) compared to women (25.0%). Conversely, the opposite profile was observed for contaminated water or food, in which women were more affected (75.0%) (p<0.001).

Regarding education level, sexual transmission was more frequent among individuals with higher education (66.7%) compared to those with primary education (28.6%). On the other hand, for infections attributed to the ingestion of contaminated water or food, an inverse pattern was observed: 71.4% of individuals with primary education indicated this as the likely source of infection, compared to 33.3% among those with higher education (p=0.017). Secondary education was not associated with the likely source or mechanism of infection, according to the results of the adjusted standardized residuals (**Table 3**).

Regarding the city of residence, Florianópolis presented a higher proportion of cases associated with a probable sexual source (63.7%) compared to São José (28.6%) and Palhoça (25.0%) (p=0.005). The analysis revealed a significant association between the presence of HIV/AIDS and the reported infection mechanism. Among individuals with HIV/AIDS, the sexual route was predominant, being reported as the probable source of infection by 82.4% of cases. In contrast, only 17.6% of individuals with HIV/AIDS attributed the infection to the ingestion of contaminated food or water (p<0.001). A similar pattern was observed for infections by other STIs (p=0.021) (**Table 3**).

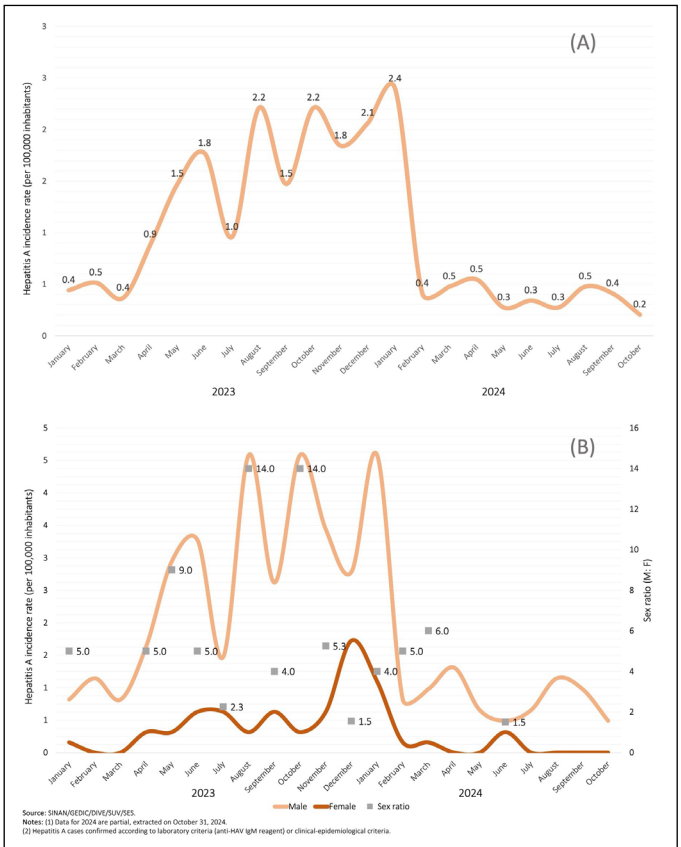
When estimating the monthly incidence rates during the period, an increase was observed from March 2023, reaching a peak of 2.4 cases per 100,000 inhabitants in the Greater Florianópolis region in January 2024, followed by a decrease from February 2024 onwards. When analyzing by sex, it was observed that men presented consistently higher rates in all months throughout the study period. In August and October 2023, the incidence rate among men reached 4.6 cases per 100,000 male inhabitants. In those same months, the sex ratio reached 14.0, indicating a male predominance, with 14 males affected for every female (**Figure 1**).

In 2023, Florianópolis recorded the highest incidence rate in the region, with 35 cases per 100,000 inhabitants. Other cities in the region also presented high incidence rates, such as Governador Celso Ramos (17.7/100,000) and São José (7.8/100,000) in 2023. The incidence rate for the entire Greater Florianópolis region in 2023 was 16.2 cases per 100,000 inhabitants, while in 2024 it was 5.8 cases per 100,000 inhabitants. In 2024, a decrease in rates was observed in all cities, but cases emerged in Biguaçu, which had not been previously recorded in 2023 (**Figure 2**).

DISCUSSION

The study revealed greater vulnerability to hepatitis A in males and young adults. The main sources of infection were sexual transmission (almost half of the cases), followed by contaminated water or food. Florianópolis had the highest incidence rate in the region. Sexual transmission was more common in men than in women, while women were more affected by contaminated water or food. Individuals with higher education showed a higher frequency of infection through sexual transmission, while those with primary education were more affected by contaminated water or food.

Researchers point out that males and young adults are more frequently affected by hepatitis A[5,10], findings that were corroborated by the data of this study. Furthermore, hepatitis A has been recognized



Source: SINAN/GEDIC/DIVE/SUV/SES.
(A) Monthly incidence rate of hepatitis A, without distinction by sex;
(B) Monthly incidence rate stratified by sex and sex ratio.

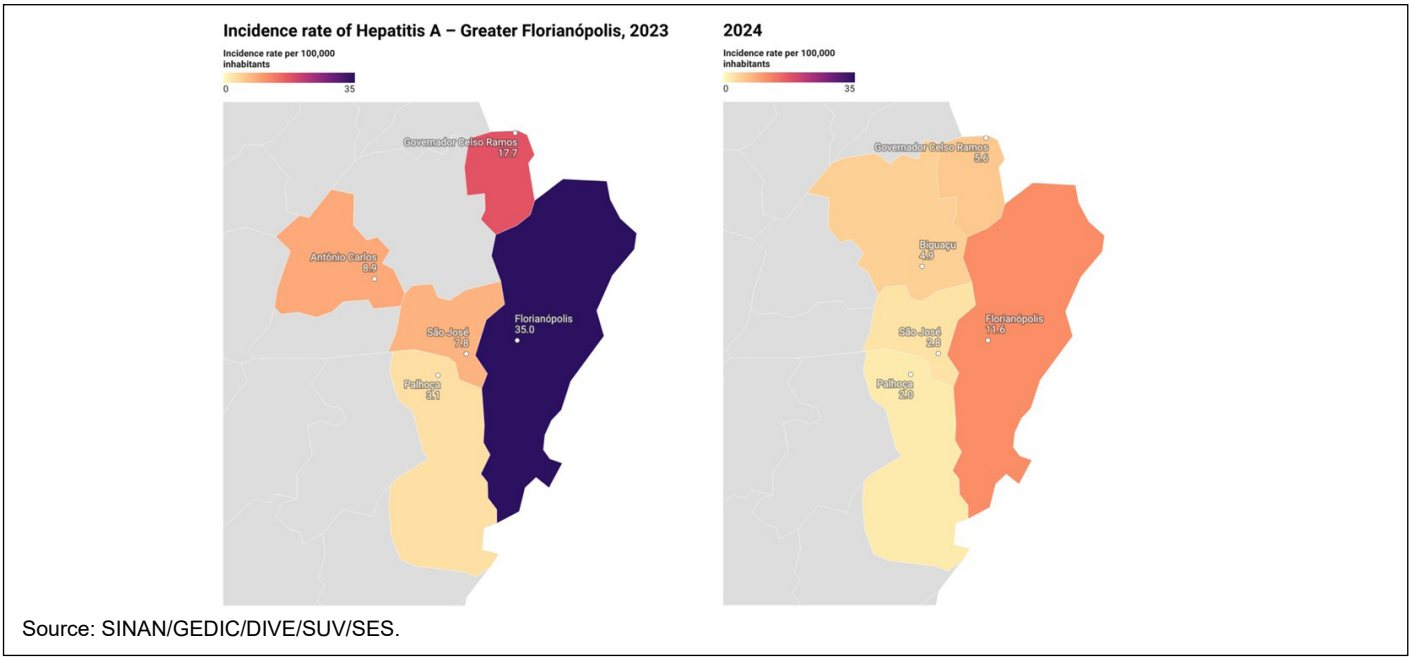
Figure 1. Monthly incidence rate of hepatitis A (per 100,000 inhabitants) in the Greater Florianópolis region, 2023–**2024.**

for decades as an STI, prevalent among men who have sex with men[11,12]. Outbreaks in this population have been predominantly recorded in high-income countries, including the United States of America (USA), Germany, and Sweden[13,14,15]. A study on hepatitis A outbreaks in the USA since 2016 showed that early detection, coupled with a rapid response, was fundamental to controlling the disease. In California, vaccination efforts in vulnerable populations and organizational partnerships contributed significantly to success in managing the outbreak[16].

In this study, the observation that, among individuals with higher education, the majority were possibly affected through sexual transmission (66.7%) may seem counterintuitive, as higher education is expected to be associated with better access to information and, consequently, lower-risk behaviors. However, the relationship between education and risky behaviors for STIs is not linear, being influenced by social, cultural, and behavioral factors[17,18]. In agreement with these findings, a study carried out with university students in Pelotas identified that risky sexual behaviors were associated with the male sex[17]. Furthermore, the authors also identified an association with the frequency of alcohol consumption and the use of mobile applications for sexual purposes[17].

On the other hand, individuals with primary education were more affected by the likely ingestion of contaminated water or food (71.4%), an expected factor, since schooling can serve as an indirect indicator of income, which in turn is associated with barriers to access to health resources, basic sanitation and education[19]. Another recent problem in Brazil is linked to climate change. Researchers analyzed the relationship between flood areas and cases of hepatitis A in Rio Grande do Sul, observing a 300% increase in hepatitis A records after the floods, highlighting new populations vulnerable to the disease[20].

During the period of high case increase, Florianópolis presented an incidence rate of 35 cases per 100,000 inhabitants in 2023, while



Source: SINAN/GEDIC/DIVE/SUV/SES.

Figure 2. Distribution of hepatitis A incidence rates in the Greater Florianópolis region according to the municipality of residence of cases, 2023–**2024.**

the state of Santa Catarina registered a rate of 3.4 cases in the same period[7]. This corresponds to a difference of approximately 921% between the capital and the state, indicating a significant concentration of cases in Florianópolis, but with a significant drop in incidence between February and October 2024. When evaluating the monthly rate, a peak in cases was observed in January 2024, a period that coincides with the summer holidays and New Year's celebrations. This increase may be related to the increased tourist flow, the greater concentration of people at events and outdoor activities, as well as the intensification of risky behaviors during the festive period.

Given this context, it is important to highlight that vaccination is an efficient and cost-effective measure, with a direct impact on individual and collective protection, creating barriers to the spread of the virus in the community. The high concentration of cases in Florianópolis reinforces the need to prioritize immunization campaigns in the region, including expanding access to vaccines and raising awareness about their importance, especially during the summer holidays.

A study published in 2020 revealed that the incidence rate of hepatitis A in Brazil decreased from 3.29 to 0.80 cases per 100,000 inhabitants between 2014 and 2018, with a particularly significant drop among children under five years of age[21]. However, the absolute number of cases increased again in 2017, due to the rise in cases among young adult males, especially in the Southeast region of the country[22]. There is a general trend of weakening vaccination efforts in the country, also observed for other vaccines, such as polio and MMR[21].

Finally, it was observed that among the people notified with Hepatitis A, 19.3% had HIV/AIDS co-infection. It is noteworthy that vaccines against hepatitis A are recommended for people living with HIV/AIDS in Brazil[23]. Immunocompromised individuals, such as those with HIV, have a higher risk of developing severe forms of hepatitis A, with longer duration of symptoms and the possibility of liver complications[24]. Therefore, it is important to consider strategies to increase adherence to immunization.

The findings of this study highlight the need for prevention and health education interventions adapted to the different transmission mechanisms. For the young male population, in particular, the implementation of awareness campaigns on safe sexual practices, associated with vaccination when indicated, is recommended. Simultaneously, strategies focused on the control and surveillance of water and food quality should be adopted, aiming to reduce risks for the entire population.

Limitations

It is crucial to consider some limitations when interpreting the results of this study. Since the data analyzed comes from notifications (secondary data), they may be subject to errors in completion, missing information, or inconsistencies in the records. Despite these limitations, the relevance of the SINAN databases as an indispensable tool for monitoring cases is highlighted, providing essential information for epidemiological surveillance and the planning of prevention and control strategies.

Strengths

This study also presents strengths. First, the topicality and relevance of the theme is evidenced, by producing local evidence about a recent outbreak, providing updated data that can support surveillance, prevention, and control actions. The specific geographic delimitation of Greater Florianópolis allows for a contextualized analysis, favoring the understanding of regional particularities and the planning of more effective interventions. Furthermore, the study includes the calculation of essential epidemiological indicators, such as incidence rates and sex ratios, which allows for comparisons with other studies and broadens the applicability of the results in the continuous monitoring of the disease.

CONCLUSION

The analysis of hepatitis A cases in Greater Florianópolis concluded that important differences in the epidemiological profile of the population were highlighted, with a higher frequency of cases in males, young people, and educated individuals, in addition to distinct associations between transmission routes and sociodemographic factors. The results revealed marked differences in the epidemiological profile of cases, according to the probable transmission mechanism. Sexual transmission predominated among men, individuals with higher education levels, and residents of Florianópolis, and was associated with HIV/AIDS co-infection. On the other hand, transmission via contaminated water or food was more frequent among women and individuals with lower education levels. These findings highlight the importance of targeted prevention and control strategies, considering the particularities of each group.

Approval by the Human Research Ethics Committee

The data were analyzed in an anonymized manner, without any identification of the participants. Thus, since the data is in the public domain and lacks personal identification, it was not necessary to submit it for ethical review, in accordance with Resolution No. 674, of May 6, 2022 (art. 26, items III and V).

Authors' contributions

RCSV: Conceptualization, Writing – original draft, Writing – review & editing. DH: Conceptualization, Formal Analysis, Writing – original draft, Writing – review & editing. AVG: Conceptualization, Writing – original draft, Writing – review & editing. ECO: Conceptualization, Writing – original draft, Writing – review & editing. SMSP: Conceptualization, Writing – original draft, Writing – review & editing. AJS: Conceptualization, Writing – original draft, Writing – review & editing. CVDLJ: Conceptualization, Writing – original draft, Writing – review & editing. ARM: Conceptualization, Writing – original draft, Writing – review & editing. JABF: Conceptualization, Writing – original draft, Writing – review & editing. All authors approved the final version of the manuscript and are responsible for its content.

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REFERENCES

1. Secretaria de Estado da Saúde de Santa Catarina (SES/SC). Hepatite A [Internet]. Santa Catarina: Dive SC; 2023 [cited on 2024 Nov 04]. Available from: https://dive.sc.gov.br/index.php/doencas-e-agravos/hepatite-a
2. Workowski KA, Bolan GA, Centers for Disease Control and Prevention - CDC. Sexually transmitted diseases treatment guidelines, 2015. MMWR Recomm Rep. 2015;64(RR-03):1-137.
3. Gloriani NG, de Paz-Silava SLM, Allison RD, Takashima Y, Avagyan T. The Shifting Epidemiology of Hepatitis A in the World Health Organization Western Pacific Region. Vaccines (Basel). 2024;12(2):204. https://doi.org/10.3390/vaccines12020204
4. Secretaria de Estado da Saúde de Santa Catarina – SES/SC. Nota informativa nº 011/2023 – LACEN/DIVE/SUV-SES/SC: orientações sobre a vigilância dos casos de hepatite A [Internet]. Florianópolis: SES/SC; 2023 [cited on 2024 Nov 04]. Available from: https://dive.sc.gov.br/phocadownload/notas-informativas/notas-informativas-2023/NI11.2023.pdf
5. Cao G, Jing W, Liu J, Liu M. The global trends and regional differences in incidence and mortality of hepatitis A from 1990 to 2019 and implications for its prevention. Hepatol Int. 2021;15(5):1068-82. https://doi.org/10.1007/s12072-021-10232-4
6. Carrilho FJ, Mendes Clemente C, da Silva LC. Epidemiology of hepatitis A and E virus infection in Brazil. Gastroenterol Hepatol. 2005;28(3):118-25. https://doi.org/10.1157/13072011
7. Brasil. Ministério da Saúde. Boletim Epidemiológico – Hepatites Virais 2024 [Internet]. Brasília: Ministério da Saúde; 2024 [cited on 2024 Nov 13]. Available from: https://www.gov.br/aids/pt-br/central-de-conteudo/boletins-epidemiologicos/2024/boletim-epidemiologico-hepatites-virais-2024/view
8. Brasil. Ministério da Saúde. Nota informativa nº 55/2019-CGAE/DIAHV/SVS/MS: orientações acerca dos critérios de definição de casos para notificações de hepatites virais [Internet]. Brasília: Ministério da Saúde; 2019 [cited on 2024 Nov 04]. Available from: https://portalsinan.saude.gov.br/images/documentos/Agravos/Hepatites_Virais/Nota_Informativa_Hepatites_Virais.pdf
9. Brasil. Ministério da Saúde. Resolução nº 674, de 6 de maio de 2022. Dispõe sobre a tipificação da pesquisa e a tramitação dos protocolos de pesquisa no Sistema CEP/Conep [Internet]. Brasília: Ministério da Saúde; 2022 [cited on 2024 Nov 04]. Available from: https://www.gov.br/conselho-nacional-de-saude/pt-br/atos-normativos/resolucoes/2022/resolucao-no-674.pdf/view
10. Leal PR, Guimarães RJPS, Kampel M. Sociodemographic and spatiotemporal profiles of hepatitis A in the state of Pará, Brazil, based on reported notified cases. Geospat Health. 2021;16(2). https://doi.org/10.4081/gh.2021.981
11. Urbanus AT, van Houdt R, van de Laar TJ, Coutinho RA. Viral hepatitis among men who have sex with men, epidemiology and public health consequences. Euro Surveill. 2009;14(47):19421. https://doi.org/10.2807/ese.14.47.19421-en
12. Hess KL, Crepaz N, Rose C, Purcell D, Paz-Bailey G. Trends in sexual behavior among men who have sex with men (MSM) in high-income countries, 1990–2013: a systematic review. AIDS Behav. 2017;21(10):2811-34. https://doi.org/10.1007/s10461-017-1799-1
13. Stene-Johansen K, Tjon G, Schreier E, Bremer V, Bruisten S, Ngui SL, et al. Molecular epidemiological studies show that hepatitis A virus is endemic among active homosexual men in Europe. J Med Virol. 2007;79(4):356-65. https://doi.org/10.1002/jmv.20781
14. Werber D, Michaelis K, Hausner M, Sissolak D, Wenzel J, Bitzegeio J, et al. Ongoing outbreaks of hepatitis A among men who have sex with men (MSM), Berlin, November 2016 to January 2017 – linked to other German cities and European countries. Euro Surveill. 2017;22(5):30457. https://doi.org/10.2807/1560-7917.es.2017.22.5.30457
15. Hofmeister MG, Gupta N, Hepatitis A Mortality Investigators. Preventable deaths during widespread community hepatitis A outbreaks - United States, 2016-2022. MMWR Morb Mortal Wkly Rep. 2023;72(42):1128-33. https://doi.org/10.15585/mmwr.mm7242a1
16. Horn EK, Herrera-Restrepo O, Acosta AM, Simon A, Jackson B, Lucas E. The burden of hepatitis A outbreaks in the United States: health outcomes, economic costs, and management strategies. J Infect Dis. 2024;230(1):e199-e218. https://doi.org/10.1093/infdis/jiae087
17. Gräf DD, Mesenburg MA, Fassa AG. Risky sexual behavior and associated factors in undergraduate students in a city in Southern Brazil. Rev Saúde Pública. 2020;54:41. https://doi.org/10.11606/s1518-8787.2020054001709
18. Bertoli RS, Scheidmantel CE, Carvalho NSD. Estudantes universitários e a infecção pelo HIV: um estudo sobre comportamento sexual e vulnerabilidades. DST. 2016;28(3):90-5.
19. Machado AM, Souza GCF, Teodoro GC, Fonseca LC, França RF. A falta de saneamento básico e sua relação com a hepatite A - uma abordagem descritiva sobre a doença. Rev Saúde Foco. 2021;13:32-50.
20. Silveira PO, Guasselli LA, Oliveira GG, Nascimento VF. Relationship between cases of hepatitis A and flood areas, municipality of Encantado, Rio Grande do Sul, Brazil. Cien Saude Colet. 2021;26(2):721-8. https://doi.org/10.1590/1413-81232020261.30592018
21. Brito WI, Souto FJD. Vacinação universal contra hepatite A no Brasil: análise da cobertura vacinal e da incidência cinco anos após a implantação do programa. Rev Bras Epidemiol. 2020;23:E200073. https://doi.org/10.1590/1980-549720200073
22. Brasil. Ministério da Saúde. Boletim Epidemiológico: Hepatites Virais 2018. Brasil: Ministério da Saúde; 2018.
23. Brasil. Ministério da Saúde. Hepatite A [Internet]. Brasília: Ministério da Saúde; 2025 [cited on 2025 Jan 20]. Available from: https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/h/hepatites-virais/hepatite-a
24. Sociedade Brasileira de Infectologia. Imunossuprimidos [Internet]. São Paulo: Sociedade Brasileira de Infectologia; 2024 [cited on 2024 Nov 04]. Available from: https://infectologia.org.br/movimento-vacinacao/imunossuprimidos/?utm_source=chatgpt.com

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