

Article

Hepatitis B and C in Immigrants and Refugees in Central Brazil: Prevalence, Associated Factors, and Immunization

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Citation: Martins, T.L.S.; Silva, G.R.d.C.e.; Silva, C.d.A.; Gomes, D.O.; Diniz e Silva, B.V.; Carneiro, M.A.d.S.; Pacheco, L.R.; Araujo, N.M.d.; Zanchetta, M.S.; Teles, S.A.; et al. Hepatitis B and C in Immigrants and Refugees in Central Brazil: Prevalence, Associated Factors, and Immunization. *Viruses* **2022**, *14*, 1534. <https://doi.org/10.3390/v14071534>

Academic Editors: Lia L. Lewis-Ximenez, Livia Melo Villar and François-Loïc Cosset

Received: 15 May 2022

Accepted: 11 July 2022

Published: 14 July 2022

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Abstract: **Introduction:** Eliminating hepatitis B and C in immigrant and refugee populations is a significant challenge worldwide. Given the lack of information in Brazil, this study aimed to estimate the prevalence of infections caused by hepatitis B and C viruses and factors associated with hepatitis B in immigrants and refugees residing in central Brazil. **Methods:** An observational, cross-sectional, and analytical study was conducted from July 2019 to January 2020 with 365 immigrants and refugees. Hepatitis B was detected by a rapid immunochromatographic test, enzyme immunoassay, and chemiluminescence, and hepatitis C by rapid immunochromatographic test. Multiple analysis was used to assess factors associated with hepatitis B infection. **Results:** Of the participants, 57.8% were from Haiti and 35.6% were from Venezuela. Most had been in Brazil for less than 2 years (71.2%). The prevalence of HBV infection and exposure was 6.6% (95% CI: 4.5–9.6%) and 27.9% (95% CI: 23.6–2.8%), respectively, and 34% had isolated anti-HBs positivity. Reporting a sexually transmitted infection was statistically associated with HBV infection (OR: 7.8; 95% CI: 2.3–26.4). No participant with positive anti-HCV serology was found. **Conclusions:** The study showed that participants were outside the reach of prevention and control actions for hepatitis B. Therefore, public health strategies must be designed to reach, inform, and vaccinate this group.

Keywords: hepatitis; hepatitis B; emigration and immigration; immunization

1. Introduction

Hepatitis B and C refer to inflammation of the liver caused by hepatitis B virus (HBV) and hepatitis C virus (HCV), respectively, and are a severe public health problem worldwide [1,2]. Although transmission can occur via parenteral and sexual routes [3], in the epidemiology of hepatitis B, the vertical route is a necessary means of transmission in countries with a high prevalence [4,5].

A modeling study estimated the number of chronic hepatitis B carriers worldwide to be 291,992 million [6]. In addition, current data show that more than 58 million people are infected with HCV [7]. Finally, according to the World Health Organization (WHO), there were three million new hepatitis B and C cases and 1.1 million deaths from these viruses in 2019 [1].

Hepatitis B and C can be acute or chronic and asymptomatic or oligosymptomatic [7–9] and have been responsible for the most significant burden of liver cancer. The hepatitis

B vaccine has been available since the 1980s and has drastically reduced the prevalence of hepatitis B, changing the epidemiological scenario in countries implementing it [10]. Although no vaccine for hepatitis C exists, it is now considered curable through direct antivirals. However, despite these significant advances, access to hepatitis B vaccination, diagnosis, and treatment of viral hepatitis is a major global challenge.

The World Alliance against Viral Hepatitis and WHO currently promote strategies to eliminate viral hepatitis as a public health problem, to reduce new cases by 90% and deaths from viral hepatitis by 65% by 2030 [11]. On the other hand, to achieve these goals, it is essential to reach socially vulnerable subpopulations at risk of exposure to HBV and HCV [12,13], such as immigrants and refugees, an emerging population worldwide.

Despite not receiving massive influxes of refugees, Brazil is experiencing a gradual increase in the migration of people [14–16]. The burden of illness on this group is exacerbated by their shared history (country of origin with high rates of infectious diseases and poor prevention programs) [17–20] and the difficulties of migration [21,22], in addition to living as individuals on the margins in modern Brazil with an unprepared public sector [23]; these conditions may favor the acquisition and transmission of infectious diseases such as hepatitis B and C [24].

There is little information on living and health conditions, and there appear to be no studies on hepatitis B and C among Brazil's immigrant and refugee population. Thus, the objective was to estimate the prevalence of viral hepatitis B and C and factors associated with hepatitis B in immigrants and refugees from Goiás, Central-West Brazil.

2. Materials and Methods

2.1. Study Design

This is an observational, cross-sectional, and analytical study.

2.2. Study Location and Target Population

The target population consisted of immigrants and refugees residing in Goiás. Data from the 2015 Migration survey in Goiás show that the State of Goiás has 13,563 residents born in other countries [25]. However, the media shows that immigrant and refugee populations are increasing, mainly among those in vulnerable situations [26]. Thus, the study was performed in this region because it has the highest concentration of immigrants and refugees.

To calculate the sample size, the median HBsAg prevalence (6.1%) presented by Coppola et al. [27] in immigrant populations, a significance level of 95% ($\alpha < 0.05$), design effect 1.5, and absolute precision of 3% were used. Thus, 367 immigrants were needed to compose the sample. The study included 365 immigrants and refugees.

2.3. Inclusion and Exclusion Criteria

The inclusion criteria were to be an immigrant in Goiás and identify with at least one of the following migratory statuses: economic immigrant, refugee, environmentally displaced person, immigrant for humanitarian reasons, immigrant from mixed migratory flows, or stateless person. In addition, individuals who had been in Brazil for more than 10 years and aged less than two years were excluded.

An immigrant is understood to be someone who migrates from one country to another to establish habitual residence. Several reasons can drive this migration, such as economic interests, environmental disasters, studies, medical treatment, conflicts, or persecution. A refugee is an immigrant who left their country due to persecution or another situation that affects human rights and is forced to move to preserve their life or freedom under vulnerable conditions and needs international protection [28,29].

2.4. Data Collection

The approach to immigrants and refugees was made with the help of members of non-governmental organizations that serve this population and leaders of immigrant and

refugee communities in Goiás. Data collection strategies were defined, and the data collection instrument was constructed in meetings and workshops with established community partners. A convenience sample was proposed due to the lack of knowledge of the current number of immigrants and refugees in Goiás, the difficulty of accessing them, and linguistic and cultural challenges. Study data were collected from July 2019 to January 2020 at the Faculty of Nursing of the Federal University of Goiás and previously arranged community partner sites (churches, migrant pastoral association, Spiritist center).

Data collection instruments were prepared in Portuguese, Spanish, French, and Creole (Haiti). In addition, interviewers fluent in the languages of the immigrants/refugees were trained by the project team.

Initially, the researchers asked eligible participants in the study to read and sign the Free and Informed Consent Form, and those under 18 years of age were consented using the Terms of Informed Consent of Children and Adolescents and Free and Informed Assent. After reading and signing the terms, all participants were interviewed privately, using a structured script containing questions addressing sociodemographic data, immigration, non-sexual characteristics, and sexual characteristics.

Then, 10 mL of blood was collected from each participant, by peripheral venipuncture in the upper arm, for rapid testing of hepatitis B and hepatitis C. After performing rapid testing, the remaining sample (about 9 mL) was poured into test tubes, identified with the number of participants, placed in an air-conditioned thermal box, and sent to the Multi-user Clinical Research Laboratory (LAMPEC) of the Faculty of Nursing/UFG; then, the blood samples were centrifuged to obtain serum and plasma, aliquoted, and stored in a -20°C freezer until removal for laboratory tests for hepatitis B.

The vaccination coverage estimate was based on hepatitis B serology and vaccination records, either a Brazilian vaccination card or similar from the country of origin.

2.5. Serological Tests

At the time of data collection, all blood samples were tested using rapid tests for hepatitis B (rapid immunochromatographic test for qualitative determination of Hepatitis B virus surface antigen; Bioclin-HBsAg commercial kit; sensitivity of 99.9% and specificity of 99.8%) and hepatitis C (rapid immunochromatographic test for qualitative determination of anti-HCV; Abon commercial kit; sensitivity of 99.53% and specificity of 99.78%).

After this step, in the laboratory, all blood samples were retested to detect serological markers of hepatitis B by enzyme immunoassay (ELISA) and chemiluminescence: HBsAg (ELISA, Biokit S.A. Barcelona, Spain, sensitivity 100% and specificity 99.58%); Anti-HBs (ELISA, Biokit S.A. Barcelona, Spain, sensitivity of 99.9% and specificity of 99.4%); Anti-HBc (chemiluminescence, Abbot Core Laboratory, Wiesbaden, Germany, sensitivity of 100% and specificity of 99.90%).

2.6. Data Analysis and Processing

Interview data and serological test results were entered into EpiData and analyzed using the Stata 13 statistical package (StataCorp., College Station, TX, USA). Descriptive analysis was performed using frequency distributions, means, and standard deviations. In addition, Chi-squared and Fisher's exact tests were used to test differences between proportions. Prevalences were calculated with 95% confidence intervals.

Individuals aged 17 years or older were selected to identify the variables associated with HBV infection. This age was selected based on the mean age of first sexual intercourse in the studied group: 16.69 years. Independent variables investigated for the specific outcome with $p < 0.250$ were subjected to multiple logistic regression analyses using the Forward method. Values of $p < 0.05$ were considered significant.

3. Results

The sociodemographic characteristics of the participants in this study are shown in Table 1. Most participants were male (57%), between 18 and 50 years old (79.2%; mean of

30 years), single/separated/widowed (53.9%), and reported more than 11 years of education (55.8%; mean of 10 years). In addition, more than 90% of the investigated individuals had some religion (93.1%). Regarding the country of birth, 57.8% were from Haiti.

When asked about their immigration status in Brazil, most responded that they were immigrants (71.8%), and 39.9% had legal permission to stay in Brazil. Regarding their professional situation, 37.3% were unemployed and had lived in Brazil for less than 2 years (71.2%). Regarding the number of people living in the same house, most lived with more than four people (50.1%). Regarding the desire to return to their country, more than half reported yes (51.5%); most participants traveled to Brazil alone (44.2%), and regarding the difficulties faced in Brazil, more than half (61.2%) reported difficulty with the Portuguese language.

Table 1. Sociodemographic and immigration characteristics of 365 immigrants and refugees from the State of Goiás, Brazil, 2019–2020.

Variables	n = 365	(%)
Sex		
Male	208	57.0%
Female	157	43.0%
Age * 30 (12.3) **		
2–11	33	9.0%
12–17	25	6.8%
18–30	135	37.0%
31–50	154	42.2%
≥51	18	5.0%
Education * 10.3 (5.4) ** (NI: 14) ***		
≤10 years	155	44.2%
≥11 years	196	55.8%
Civil Status (NI: 5) ***		
Married/Living Together	166	46.1%
Single/Divorced/Widowed	194	53.9%
Religion (NI: 4) ***		
No	25	6.9%
Yes	336	93.1%
Country of Birth		
Brazil (1st Generation Children)	4	1.0%
Colombia	1	0.3%
Cuba	1	0.3%
Equador	1	0.3%
Spain	1	0.3%
Guinea Bissau	15	4.1%
Haiti	211	57.8%
Dominican Republic	1	0.3%
Venezuela	130	35.6%
Continent of Origin		
Africa	15	4.2%
Central America	198	54.2%
South America	152	41.6%
Status in Brazil		
Immigrant	262	71.8%
Refugee	99	27.1%
Brazilian	4	1.1%
Type of visa to remain in Brazil (NI: 4) ***		
Humanitarian Visa	30	8.3%
Permanent Visa	144	39.9%
Work visa	24	6.6%
Temporary visa	63	17.5%

Table 1. Cont.

Variables	n = 365	(%)
Student visa	17	4.7%
Refugee	61	16.9%
Application in progress	18	5.0%
Brazilian	4	1.1%
Professional Situation in Brazil (NI: 3) ***		
Permanent contract	120	33.3%
Temporary contract	33	9.1%
Self-Employed	32	8.7%
Occasional Work	9	2.5%
Unemployed	135	37.3%
Student	24	6.6%
Child, not school aged	9	2.5%
Years in Brazil 1.7 (2.2) **		
≤2	260	71.2%
≥3	105	28.8%
Number of people living in the same house 3.3 (2.3) ** (NI: 10) ***		
≤3	177	49.9%
≥4	178	50.1%
Desire to return to their country of origin (NI: 10) ***		
No	121	34.1%
Yes	183	51.5%
Do not Know	51	14.4%
Arrived in Brazil (NI: 10) ***		
Alone	157	44.2%
With Family	156	44.0%
With Friends	42	11.8%
Facing difficulty in Brazil related to (NI: 9) ***		
No difficulty	58	16.3%
Portuguese language	218	61.2%
Finding a job	52	14.6%
Legalization of immigration status	8	2.2%
Employer	1	0.3%
Adapting to work	1	0.3%
Adapting to the climate	7	2.0%
Adapting to food	2	0.6%
Adapting to culture	1	0.3%
Race/ethnicity/color bias	4	1.1%
Problems with health services	3	0.8%
Unstable Conditions	1	0.3%

* Years. ** Mean (standard deviation). *** NI: No Information.

Of the total number of immigrants and refugees investigated, 102 had serological markers of exposure to HBV, resulting in an overall prevalence of 27.9% (95% CI: 23.6–32.8%). HBsAg reactivity was found in 24 samples (6.6%; 95% CI: 4.5–9.6%). Isolated anti-HBs, a marker of previous immunization against hepatitis B, was detected in 124 samples (34%; CI: 29.3–39.0).

Table 2 presents data on current or past infection and susceptibility considering the continent of origin. The highest present and past infection rates were found in African immigrants and refugees, followed by Central and South America. In addition, a larger number of people susceptible to HBV were identified among immigrants and refugees from Central America.

Table 2. Data on current infections, past infections, and susceptibility considering the continent of origin of 365 immigrants and refugees from the State of Goiás, Brazil, 2019–2020.

Variable	Present Infection (HBsAg)		Past Infection (Anti-HBs + Anti-HBc or Isolated Anti-HBc)		Susceptible (No Serological Marker for HBV)	
	Positive n = 24 (%)	Negative n = 341 (%)	Positive n = 78 (%)	Negative n = 187 (%)	Yes n = 139 (%)	No n = 226 (%)
Continent						
South America	5 (3.3)	147 (96.7)	6 (3.9)	146 (96.1)	57 (37.5)	95 (62.5)
Central America	17 (8.6)	181 (91.4)	62 (31.3)	136 (68.7)	81 (40.9)	117 (59.1)
Africa	2 (3.3)	13 (96.7)	10 (66.7)	5 (33.3)	1 (6.7)	14 (93.3)

After logistic regression, to assess the variables associated with HBV infection, only the variable “history of Sexually Transmitted Infections (STIs)” remained statistically associated with HBsAg ($p < 0.05$) (Table 3).

Prior immunization for hepatitis B was observed in 39.5% ($n = 144/365$) of the investigated group, either through isolated positivity for the anti-HBs marker (34%; $n = 124/365$) or a record of three doses of the hepatitis B vaccine (12.6%; $n = 46/365$). The vaccination card was available for 137 participants, of which 46 had a record of three doses of the hepatitis B vaccine and 91 had one or two doses of the hepatitis B vaccine. Table 4 shows the characteristics of the participants according to serological test for immunization (isolated anti-HBs) or vaccination (three doses of hepatitis B vaccine) status. It can be observed that there was a significant difference between the groups considering gender, their continent of birth, and years living in Brazil ($p < 0.05$). A review of vaccination records revealed that 88.1% started the vaccination schedule in Brazil.

Table 3. Bivariate and multiple analysis of sociodemographic characteristics, immigration, and factors associated with HBsAg positivity in 311 foreign immigrants from the State of Goiás, 2019–2020.

Variables	Bivariate Analysis HBsAg (n = 311)			p	Multiple Analysis **** (n = 299)	
	Total n = 311 (%)	Positive n = 24 (%)	Negative n = 287 (%)		p	OR (95% CI) ***
Sex						
Female	134 (43.0)	8 (6.0)	126 (94.0)	0.315		
Male	177 (57.0)	16 (9.0)	161 (91.0)			
Age						
≤30	139 (44.7)	9 (6.5)	130 (93.5)	0.461		
≥31	172 (55.3)	15 (8.7)	157 (91.3)			
Education * (NI: 8) **						
≤10 years	112 (37.0)	9 (8.0)	103 (92.0)	0.955		
≥11 years	191 (63.0)	15 (7.8)	176 (92.2)			
Civil Status (NI: 5) **						
Sing/e/Divorced/Widow	140 (45.7)	12 (8.6)	128 (91.4)	0.663		
Married/Living Together	166 (54.3)	12 (7.2)	154 (92.8)			
Religion (NI: 3) **						
No	18 (5.8)	2 (11.1)	16 (88.9)	0.588		
Yes	290 (94.2)	22 (7.6)	268 (92.4)			
Years in Brazil						
≤2	211 (67.9)	13 (6.2)	198 (93.8)	0.135		
≥3	100 (32.1)	11 (11.0)	89 (89.0)			
Continent of origin						
South America	107 (34.4)	5 (4.7)	102 (95.3)	0.288		
Central America	189 (60.8)	17 (9.0)	172 (91.0)			
Africa	15 (4.8)	2 (13.3)	13 (86.7)			
Do you have or have you had Hepatitis? ***** (NI: 4) **						
No or do not know	298 (97.1)	22 (7.4)	276 (92.6)	0.150		
Yes	9 (2.9)	2 (22.2)	7 (77.8)			
Cases of hepatitis in family or partner? (NI: 4) **						
No or do not know	280 (91.2)	22 (7.9)	258 (92.1)	0.934		
Yes	27 (8.8)	2 (7.4)	25 (92.6)			
Blood Transfusion (NI: 4) **						
No or do not know	289 (94.1)	23 (8.0)	266 (92.0)	0.713		
Yes	18 (5.9)	1 (5.6)	17 (94.4)			

Table 3. Cont.

Variables	Bivariate Analysis HBsAg (n = 311)				Multiple Analysis **** (n = 299)	
	Total n = 311 (%)	Positive n = 24 (%)	Negative n = 287 (%)	<i>p</i>	<i>p</i>	OR (95% CI) ***
Alcohol use (NI: 4) **						
No	141 (45.9)	13 (9.2)	128 (90.8)	0.399		
Yes	166 (54.1)	11 (6.6)	155 (93.4)			
Non-injection drug use (NI: 4) **						
No	304 (99.0)	24 (7.9)	280 (92.1)	0.612		
Yes	3 (1.0)	0 (0.0)	3 (100.0)			
Piercing (NI: 4) **						
No	276 (89.9)	22 (8.0)	254 (92.0)	0.765		
Yes	31 (10.1)	2 (6.5)	29 (93.5)			
Surgery (NI: 4) **						
No or do not know	225 (73.3)	17 (7.6)	208 (92.4)	0.777		
Yes	82 (26.7)	7 (8.5)	75 (91.5)			
Tattoo (NI: 4) **						
No	284 (92.5)	21 (7.4)	263 (92.6)	0.332		
Yes	23 (7.5)	3 (13.0)	20 (87.0)			
Victim of violence (NI: 3) **						
No	256 (83.1)	20 (7.8)	236 (92.2)	0.976		
Yes	52 (16.9)	4 (7.7)	48 (92.3)			
Age of first sexual relations * (NI: 32) **						
≤16	136 (48.8)	9 (6.6)	127 (93.4)	0.444		
≥17	143 (51.2)	13 (9.1)	130 (90.9)			
History of sexual abuse (NI: 3) **						
No	281 (91.2)	23 (8.2)	258 (91.8)	0.407		
Yes	27 (8.8)	1 (3.7)	26 (96.3)			
Sex work (NI: 3) **						
No	299 (97.7)	23 (7.7)	276 (92.3)	0.706		
Yes	9 (2.3)	1 (11.1)	8 (88.9)			
Sex under the effects of alcohol or drugs (NI: 3) **						
No	274 (89.0)	20 (7.3)	254 (92.7)	0.360		
Yes	34 (11.0)	4 (11.8)	30 (88.2)			
History of Sexually Transmitted Infections (NI: 3) **						
No	293 (95.1)	19 (6.5)	274 (93.5)	0.000	0.001	1 7.8 (2.3 –26.4)
Yes	15 (4.9)	5 (33.3)	10 (66.7)			

Table 3. Cont.

Variables	Bivariate Analysis HBsAg (n = 311)			p	Multiple Analysis **** (n = 299)	
	Total n = 311 (%)	Positive n = 24 (%)	Negative n = 287 (%)		p	OR (95% CI) ***
Number of sexual partners in the last 12 months (NI: 12) **						
≤1	250 (83.6)	21 (8.4)	229 (91.6)	0.300		
≥2	49 (16.4)	2 (4.1)	47 (95.9)			
Use of a condom with a steady or casual partner in the last 12 months (NI: 6) **						
Yes	102 (33.4)	6 (5.9)	96 (94.1)	0.361		
No	203 (66.6)	18 (8.9)	185 (91.1)			
Number of people in the same house (NI: 9) **						
≤3	170 (56.3)	14 (8.2)	156 (91.8)	0.645		
≥4	132 (43.7)	9 (6.8)	123 (93.2)			

* Years. ** NI: No information. *** OR: Odds Ratio (95% CI): 95% Confidence Interval. **** Adjusted by years in Brazil and continent of origin. Hosmer–Lemeshow test $p = 0.2395$, ROC curve 0.6921. ***** Variable not included in the logistic regression model because it lacks epidemiological plausibility.

Table 4. Characteristics of the participants according to the serological status of immunization (isolated anti-HBs) or vaccination (three doses of hepatitis B vaccine) of 365 immigrants and refugees from the State of Goiás, Brazil, 2019–2020.

Variables	Isolated Anti-HBs or Completely Vaccinated			<i>p</i>
	Total n (%)	Positive n = 144 (%)	Negative n = 221 (%)	
Age *				0.000
2–17	58	38 (65.5)	20 (34.5)	
18–30	135	52 (38.5)	83 (61.5)	
31–49	145	41 (28.3)	104 (71.7)	
≥ 50	27	13 (48.1)	14 (51.9)	
Sex				0.009
Male	208	70 (33.7)	138 (66.3)	
Female	157	74 (47.1)	83 (52.9)	
Continent of Birth				0.000
Central	211	53 (25.1)	158 (74.9)	
South America	138	85 (61.6)	53 (38.4)	
Africa	15	5 (33.3)	10 (66.7)	
Europe	1	1 (100.0)	0 (0.0)	
Years living in Brazil				0.031
≤1	223	96 (43.0)	127 (57.0)	
2–4	102	38 (37.3)	64 (62.7)	
≥5	40	10 (25.0)	30 (75.0)	
Used Brazilian health services (NI: 6) **				0.980
Public	303	119 (39.3)	184 (60.7)	
Private	22	9 (40.9)	13 (59.1)	
No	34	13 (38.2)	21 (61.8)	

* Years. ** No Information.

No participant with positive anti-HCV serology was found.

4. Discussion

The challenging relationship between immigration and health appears across several dimensions, such as the economy and social integration, and they must be analyzed jointly [30]. Furthermore, most immigrants are brought into a marginal context, with precarious conditions resulting from displacement, no public sector involvement, and insecure working conditions, possibly contributing to illness in this population [23].

Research in Brazil shows that migration is characterized by young adults with an average education level higher than the Brazilian average (8 years of study) [22,31]. For example, according to 2020 OBMigra data concerning immigrants in the Brazilian formal labor market, 44.5% and 21.2% had completed high school and higher education, respectively [32]. The present research also confirmed this profile: the sample was formed predominantly by individuals between 18 and 50 years, and (n = 307) 70.5% reported having at least 10 years of schooling considering those of legal age.

The migration crises in Haiti and Venezuela are particularly relevant to Brazil's migration policy [33,34]. The present study confirms the predominance of these nationalities; 57.8% of the participants were Haitians and 35.6% Venezuelans.

Regardless of the reasons for immigration, they encounter challenges after arriving in Brazil, and this investigation highlights the language barrier. Of the 356 immigrants who answered the question about the main difficulties in adapting to Brazilian society, more than half (61.2%) spoke Portuguese. This fact may be directly related to other findings in this investigation, such as the high unemployment rate (37.3%). Furthermore, not speaking the national language complicates job opportunities and increases the group's marginalization [35].

In addition, the language barrier prevents access to health services [23]. Welcoming, diagnosing, treating, and preventing are important axes for the health of immigrants. Many come from regions with high communicable disease rates, especially hepatitis B, and recent or poor childhood vaccination programs in their places of origin, such as Haiti [18,36], Venezuela [37], and Africa [38]. Therefore, it is vital to ascertain any characteristics or life habits of immigrants and refugees residing in Goiás which can contribute to acquiring and maintaining hepatitis B.

In this scenario, the prevalence of HBV infection was 6.6% (95% CI: 4.5%–9.6%), indicating moderate-to-high endemicity. The value found was 18 times higher than the estimated HBsAg prevalence for Brazil's general population [39]. Furthermore, when comparing the present study's findings to other rates of HBsAg found in socially vulnerable populations in Brazil, the conclusion is similar. That is, lower prevalences of infection for hepatitis B were found: 2.3% in illicit drug users from the North [40], 0.8% in people living in poverty in the Midwest region [41], and 0.7% in manual sugarcane cutters in the Midwest and Northeast regions [42].

Differences were found when analyzing the prevalence of HBsAg by continent of origin, even compared to other investigations carried out in the countries that mostly comprised the sample, such as Haiti and Venezuela [18,19,43]. In the present study, in Central America ($n = 198$), where Haitians predominated (89.4%), the frequency of HBsAg was 8.6% ($n = 17/198$; 95% CI: 5.4–13.3%), while among participants from South America ($n = 152$), especially Venezuelans (87.2%), it was 3.3% ($n = 5/152$; 95% CI: 1.4–7.5%). According to the Polaris Observatory, in 2016, Haiti had an estimated 313,000 cases of HBV infection (2.9%; 95% CI: 2.7–4.1%) and Venezuela had about 364,000 cases (1.2 %; CI: 1.1–1.8%) [6].

In the present study, all infection and exposure to HBV cases occurred in individuals over 17 years of age. The variable history of STI (OR: 7.8; 95% CI: 2.3–26.4) was statistically associated with HBsAg positivity. STIs can contribute to acquiring other sexual infections, such as hepatitis B and C, and are related to risk behaviors involving unprotected sex [44,45]. Evaluating the characteristics of the 24 HBsAg positive individuals in our study, 18 reported not having used a condom in the last 12 months, and 12 were married or in a stable relationship.

In Brazil, encouraging condom use is one of Brazil's central policies for preventing sexually transmitted infections [46]. Indeed, in addition to the previously mentioned behaviors, other social and cultural situations presented by immigrants and refugees can contribute to the inconsistent use of condoms [47,48]. For example, the population was strongly influenced by religion; 93.1% were practitioners of some religion, most of them Protestant, and it is suggested that religion can negatively influence condom use [49]. Finally, it is notable that in Venezuela, in addition to lacking policies for distributing condoms to the population, between 2015 and 2019, a condom cost \$199.00, and a box of 36 condoms over \$7000.00 [50], so certainly inaccessibility contributes to non-adherence.

Not knowing their serological status among those infected with HBV is noteworthy; of the 24 positive HBsAg, only 2 (8.3%) previously reported being chronic carriers of hepatitis B. This finding may be lower than the estimates for America, where only 18% of hepatitis B cases are diagnosed [51], confirming that Brazilian strategies for early diagnosis in vulnerable groups are not effective [52]; this demonstrates the importance of countries keeping their international commitments to reach the global goals of reducing new infections of viral hepatitis.

In 39.5% ($n = 144/365$) of the investigated group, protection against hepatitis B was observed, which is below that recommended by the National Immunization Program in Brazil [53]. Indeed, many immigrants and refugees in this study come from regions with recently implemented or poor vaccination programs. This lack of access at home suggests that this percentage of immunized people may have received the vaccine in Brazil. Looking at the vaccination records of the 137 participants who presented a record of any dose of the vaccine against hepatitis, it was possible to identify that 88.1% started their vaccination schedule in Brazil.

Another relevant finding is the large proportion of those immunized or vaccinated from Venezuela with a shorter time living in Brazil. This significant difference suggests discrepancies in how refugees are received, depending on the situation. The forced displacement of thousands of Venezuelans to other countries (especially Brazil) was internationally highlighted, and the Brazilian government was supported by UN agencies and social entities in 2018 to create a reception program for these refugees. Operation Acolhida provided emergency assistance to Venezuelans crossing the border from Rondônia [54], and vaccination against hepatitis B was included. Indeed, the successes of this program must be considered by public administrators and serve as a model of service for immigrants/refugees of other nationalities who enter Brazil.

Concerning hepatitis C, behaviors and life habits may not favor anti-HCV. For example, a low number of blood transfusions, piercing, and tattooing and no cases of illicit drug use characterize a group with reduced risk for acquiring parenterally transmitted diseases, such as hepatitis C [1].

This research has some limitations. First, the convenience sampling used can compromise the external validity. On the other hand, the sociodemographic and migration characteristics presented by the group are in line with the findings of other studies [23,55], suggesting possible representativeness within the investigated nationalities.

5. Conclusions

The profile found for hepatitis B among the immigrants and refugees studied was high rate of infection, low knowledge about serological status, presence of sexual risk behaviors, and reduced access to preventive measures, evidenced mainly by the low vaccination coverage for hepatitis B; these findings reinforce that eliminating viral hepatitis in the global context requires targeting specific groups in vulnerable situations.

In the context of immigration, the Global Compact for Migration, addressed by the 2030 Agenda for Sustainable Development, is an essential framework for discussing actions that prevent, diagnose, and treat viral hepatitis. Unfortunately, since 2019, Brazil has not been part of this global agreement. Therefore, the results of this study should present a point of consideration for new public health policies aimed at immigrants and refugees in a national and international context.

The linguistic and cultural barriers were undoubtedly a great challenge for the execution of this work. However, this experience underscored the importance of inclusive health services that establish effective communication within the community.

It is essential to highlight the social impact of this study. All individuals who tested positive for hepatitis B were referred for follow-up and treatment, if necessary, via the existing public free health care system in Brazil (*Sistema Único de Saúde*—SUS).

Author Contributions: T.L.S.M. participated in the design and coordination of the study, the survey of participants, data collection, laboratory tests, and writing and review of the manuscript. G.R.d.C.e.S. participated in the coordination of the study, the survey of participants, data collection, and laboratory tests. C.d.A.S. participated in the coordination of the study, the survey of participants, data collection, and laboratory tests. D.O.G. contributed to data collection, laboratory testing, and manuscript review. B.V.D.e.S. participated in data collection, laboratory tests, and manuscript review. M.A.d.S.C. participated in data collection, laboratory tests, and manuscript review. L.R.P. participated in data collection and manuscript review. N.M.d.A. participated in the laboratory tests and review of the manuscript. M.S.Z. participated in the study design and manuscript review. S.A.T. participated in the design and coordination of the study, data collection, interpretation of analyzed data, and manuscript review. K.A.A.C. participated in the design and coordination of the study, data collection, analysis and interpretation of analyzed data, and writing and reviewing of the manuscript. All authors have read and agreed to the published version of the manuscript.

Funding: This project received funding from Brazilian public entities under the notices of the National Council for Scientific and Technological Development (CNPq) (MCTIC/CNPq N° 28/2018-Universal/Band C) and Fundação de Amparo à Pesquisa do Estado de Goiás (FAPEG) for financial

aid (Project for Public Call 4/2017-public call for 04/2017 research program for the SUS: shared management in health—FAPEG/SES-GO/CNPq/MS-DECIT/2017-PPSUS/GO).

Institutional Review Board Statement: The project was approved by the Federal University of Goiás (UFG) Ethics Committee, opinion 3243845 (4 April 2019). The confidential nature and secrecy of the information were maintained.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Not applicable.

Acknowledgments: The authors would like to thank the members of the research groups NECAIH (Nucleus of Studies in Epidemiology and Care for Transmissible Infections in Human Health Disorders) and the Virology Laboratory of the IPTSP—Institute of Tropical Pathology and Public Health for their assistance in carrying out the study. The authors also wish to thank the students and professor of Toronto Metropolitan University (Canada) for their help in translating and carrying out the data collection and serology tests.

Conflicts of Interest: The authors declare no conflict of interest.

References

- Global Progress Report on HIV, Viral Hepatitis and Sexually Transmitted Infections. 2021. Available online: <https://www.who.int/publications-detail-redirect/9789240027077> (accessed on 1 May 2022).
- Mysore, K.R.; Leung, D.H. Hepatitis B and C. *Clin. Liver Dis.* **2018**, *22*, 703–722. [[CrossRef](#)] [[PubMed](#)]
- World Health Organization. *Guidelines for the Prevention Care and Treatment of Persons with Chronic Hepatitis B Infection: Mar-15*; World Health Organization: Geneva, Switzerland, 2015; ISBN 978-92-4-154905-9.
- Keane, E.; Funk, A.L.; Shimakawa, Y. Systematic Review with Meta-Analysis: The Risk of Mother-to-Child Transmission of Hepatitis B Virus Infection in Sub-Saharan Africa. *Aliment. Pharmacol. Ther.* **2016**, *44*, 1005–1017. [[CrossRef](#)]
- Chamroonkul, N.; Piratvisuth, T. Hepatitis B During Pregnancy in Endemic Areas: Screening, Treatment, and Prevention of Mother-to-Child Transmission. *Pediatr. Drugs* **2017**, *19*, 173–181. [[CrossRef](#)] [[PubMed](#)]
- Global Prevalence, Treatment, and Prevention of Hepatitis B Virus Infection in 2016: A Modelling Study. *The Lancet*. Available online: [https://www.thelancet.com/journals/langas/article/PIIS2468-1253\(18\)30056-6/fulltext](https://www.thelancet.com/journals/langas/article/PIIS2468-1253(18)30056-6/fulltext) (accessed on 1 May 2022).
- Hepatitis C. Available online: <https://www.who.int/news-room/fact-sheets/detail/hepatitis-c> (accessed on 1 May 2022).
- Karayiannis, P. Hepatitis B Virus: Virology, Molecular Biology, Life Cycle and Intrahepatic Spread. *Hepatol. Int.* **2017**, *11*, 500–508. [[CrossRef](#)]
- Terrault, N.A.; Lok, A.S.; McMahon, B.J.; Chang, K.-M.; Hwang, J.P.; Jonas, M.M.; Brown, R.S.; Jr Bzowej, N.H.; Wong, J.B. Update on Prevention, Diagnosis, and Treatment of Chronic Hepatitis B: AASLD 2018 Hepatitis B Guidanc. *Hepatology* **2018**, *67*, 1560–1599. Available online: <https://aasldpubs.onlinelibrary.wiley.com/doi/10.1002/hep.29800> (accessed on 1 May 2022). [[CrossRef](#)]
- Hepatitis B. Available online: <https://www.who.int/news-room/fact-sheets/detail/hepatitis-b> (accessed on 1 May 2022).
- Global Hepatitis Report. 2017. Available online: <https://www.who.int/publications-detail-redirect/9789241565455> (accessed on 1 May 2022).
- Miranda, N.T.G.P.; de Souza, R.L.; Monteiro, J.C.; Costa, I.B.; Siravenha, L.Q.; da Luz, A.L.B.; de Almeida, N.C.C.; Oliveira-Filho, A.B.; Laurentino, R.V.; Machado, L.F.A. Seroprevalence of HBV and HCV in Female Sex Workers from Four Cities in the State of Pará, Northern Brazil. *J. Med. Virol.* **2021**, *93*, 3730–3737. [[CrossRef](#)]
- Weis-Torres, S.M.D.S.; Fitts, S.M.F.; Cardoso, W.M.; Higa Junior, M.G.; Lima, L.A.; Bandeira, L.M.; Castro, V.O.L.; Carneiro, F.A.; Iglecias, L.M.M.; Cesar, G.A.; et al. High Level of Exposure to Hepatitis B Virus Infection in a Vulnerable Population of a Low Endemic Area: A Challenge for Vaccination Coverage. *Int. J. Infect. Dis.* **2020**, *90*, 46–52. [[CrossRef](#)]
- Castles, S.; de Haas, H.; Miller, M.J. *The Age of Migration: International Population Movements in the Modern World*, 5th ed.; Palgrave Macmillan: Basingstoke, UK, 2014; ISBN 978-0-230-35577-4.
- Messina, A.M.; Lahav, G. (Eds.) *The Migration Reader: Exploring Politics and Policy*; Lynne Rienner Publishers: Boulder, CO, USA, 2006; ISBN 978-1-58826-314-8.
- Disability and Displacement | Forced Migration Review (*Deficiência e Deslocamento | Revisão de Migração Forçada*). Available online: <https://www.fmreview.org/disability> (accessed on 1 May 2022).
- Hepatitis B Vaccine at Birth—GAVI Responds to MSF. Available online: <https://www.gavi.org/news/media-room/hepatitis-b-vaccine-birth-gavi-responds-msf> (accessed on 1 May 2022).
- Tohme, R.A.; Andre-Alboth, J.; Tejada-Strop, A.; Shi, R.; Boncy, J.; François, J.; Domercant, J.W.; Griswold, M.; Hyppolite, E.; Adrien, P.; et al. Hepatitis B Virus Infection among Pregnant Women in Haiti: A Cross-Sectional Serosurvey. *J. Clin. Virol.* **2016**, *76*, 66–71. [[CrossRef](#)]

19. Blanco, R.Y.; Loureiro, C.L.; Villalba, J.A.; Sulbarán, Y.F.; Maes, M.; de Waard, J.H.; Rangel, H.R.; Jaspe, R.C.; Pujol, F.H. Decreasing prevalence of Hepatitis B and absence of Hepatitis C Virus infection in the Warao indigenous population of Venezuela. *PLoS ONE* **2018**, *13*, e0197662. [CrossRef]
20. Childs, L.; Adrien, P.; Minta, A.A.; François, J.; Charles, N.P.J.; Blot, V.; Rey-Benito, G.; Eng, J.L.V.; Tohme, R.A. Prevalence of Chronic Hepatitis B Virus Infection among Children in Haiti, 2017. *Am. J. Trop. Med. Hyg.* **2019**, *101*, 214–219. [CrossRef] [PubMed]
21. The Refugee Brief—18 December 2020. *Refug. Brief* **2020**. Available online: <https://www.unhcr.org/refugeebrief/the-refugee-brief-18-december-2020/> (accessed on 1 May 2022).
22. Global Trends—Forced Displacement in 2018—UNHCR. Available online: <https://www.unhcr.org/globaltrends2018/> (accessed on 1 May 2022).
23. de Sousa Alves, J.F.; Martins, M.A.C.; Borges, F.T.; Silveira, C.; Muraro, A.P. Use of health services by Haitian immigrants in Cuiabá-Mato Grosso, Brazil. *Ciênc. Saúde Coletiva* **2019**, *24*, 4677–4686.
24. Uccella, I.; Petrelli, A.; Vescio, M.F.; De Carolis, S.; Fazioli, C.; Pezzotti, P.; Rezza, G. HIV Rapid Testing in the Framework of an STI Prevention Project on a Cohort of Vulnerable Italians and Immigrants. *AIDS Care* **2017**, *29*, 996–1002. [CrossRef] [PubMed]
25. Mauro Borges. Migration Institute in Goiás between 2005 and 2015 (Instituto Mauro Borges Migração em Goiás entre 2005 e 2015). Available online: <https://www.imb.go.gov.br/files/docs/publicacoes/estudos/2017/migracao-em-goias-entre-2005-2015.pdf> (accessed on 1 May 2022).
26. Haitians Try Life in Goiás (Haitianos Tentam a Vida Em Goiás—Jornal Hora Extra). Available online: <https://jornalhoraextra.com.br/haitianos-tentam-a-vida-em-goias/> (accessed on 1 May 2022).
27. Coppola, N.; Alessio, L.; Pisaturo, M.; Macera, M.; Sagnelli, C.; Zampino, R.; Sagnelli, E. Hepatitis B Virus Infection in Immigrant Populations. *World J. Hepatol.* **2015**, *7*, 2955–2961. [CrossRef]
28. International Organization for Migration Glossary on Migration. Available online: https://publications.iom.int/system/files/pdf/iml_34_glossary.pdf (accessed on 1 May 2022).
29. Ministry of Justice, Secretariat for Legislative Affairs. Migrants, Stateless Persons and Refugees: Subsidies for Improving Access to Services, Rights and Public Policies in Brazil (Ministério da Justiça, Secretaria de Assuntos Legislativos. Migrantes, Apátridas e Refugiados: Subsídios Para o Aperfeiçoamento de Acesso a Serviços, Direitos e Políticas Públicas No Brasil). Available online: http://pensando.mj.gov.br/wp-content/uploads/2015/12/PoD_57_Liliana_web3.pdf (accessed on 1 May 2022).
30. Walden, J.; Sienkiewicz, H. Immigrant and Refugee Health in North Carolina. *N. C. Med. J.* **2019**, *80*, 84–88. [CrossRef]
31. Simões, A.; Neto, J.H.; Cavalcanti, L.; Oliveira, T.; Macêdo, M. RAIS Report the Socio-Economic Insertion of Immigrants in the Formal Job Market (*Relatório RAIS a Inserção Socioeconômica dos Imigrantes no Mercado de Trabalho Formal*); Observatório das Migrações Internacionais: Brasília, Brazil, 2019.
32. Cavalcanti, L.; Oliveira, T.; Silva, B.G. *Annual Report 2021—2011–2020: A Decade of Challenges for Immigration and Refuge in Brazil (Relatório Anual 2021—2011–2020: Uma Década de Desafios para a Imigração e o Refúgio no Brasil)*; Observatório das Migrações Internacionais: Brasília, Brazil, 2021.
33. Lenders, S. Bolivians, Haitians and Venezuelans—Three Cases of Immigration in Brazil (Bolivianos, Haitianos e Venezuelanos—Três Casos de Imigração no BRASIL) | Heinrich Böll Stiftung—Rio de Janeiro Office. Available online: <https://br.boell.org/pt-br/2019/04/15/bolivianos-haitianos-e-venezuelanos-tres-casos-de-imigracao-no-brasil> (accessed on 8 May 2022).
34. Sánchez, P.K.; Valderas, J.J.; Messenger, C.K.; Sánchez, G.C.; Barrera, Q.F. Haití, La Nueva Comunidad Inmigrante En Chile. *Rev. Chil. Pediatría* **2018**, *89*, 278–283. [CrossRef]
35. Granada, D.; Carreno, I.; Ramos, N.; da Pereira Ramos, M.C. Debating health and migrations in a context of intense human mobility. *Interface-Comun. Saúde Educ.* **2017**, *21*, 285–296. [CrossRef]
36. Llau, A.F.; Williams, M.L.; Tejada, C.E. National Vaccine Coverage Trends and Funding in Latin America and the Caribbean. *Vaccine* **2021**, *39*, 317–323. [CrossRef]
37. Venezuela (Bolivarian Republic of): WHO and UNICEF Estimates of Immunization Coverage: 2020 Revision. Available online: https://cdn.who.int/media/docs/default-source/country-profiles/immunization/immunization_ven_2021.pdf?sfvrsn=814564db_9&download=true (accessed on 1 May 2022).
38. Bayo, P.; Ochola, E.; Oleo, C.; Mwaka, A.D. High Prevalence of Hepatitis B Virus Infection Among Pregnant Women Attending Antenatal Care: A Cross-Sectional Study in Two Hospitals in Northern Uganda. *BMJ Open* **2014**, *4*, e005889. [CrossRef]
39. Pereira, L.M.M.B.; Ximenes, R.A.A.; Moreira, R.C.; Braga, M.C.; Montarroyos, U.R.; Crespo, D.; Santos, A.d.A.d.; Alencar, L.C.A.d.; Lima, M.L.C.d.; Turchi, M.D.; et al. *Population-Based Prevalence Study of Hepatitis A, B and C Virus Infections in the Capitals of Brazil (Estudo de Prevalência de Base Populacional Das Infecções Pelos Vírus Das Hepatites A, B e C Nas Capitais Do Brasil)*; University of Pernambuco: Recife, Brazil, 2010.
40. Piauense, J.N.F.; Costa, C.C.S.; Silva, R.J.S.; Cardoso, Y.M.N.; Di Miceli, J.F.F.; Resque, R.L.; Lemos, J.A.R.; Fischer, B.; Pinho, J.R.R.; Kupek, E.; et al. Hepatitis B Virus Infection among People Who Use Illicit Drugs: Prevalence, Genotypes and Risk Factors in the State of Amapá, Northern Brazil. *Subst. Use Misuse* **2020**, *55*, 1633–1639. [CrossRef] [PubMed]
41. da Cunha Guimarães, L.C.; Brunini, S.; Guimarães, R.A.; Galdino-Júnior, H.; Minamisava, R.; da Cunha, V.E.; Santos, J.R.S.; de Paula Silveira-Lacerda, E.P.; Souza, C.M.; de Oliveira, V.L.B.; et al. Epidemiology of Hepatitis B Virus Infection in People Living in Poverty in the Central-West Region of Brazil. *BMC Public Health* **2019**, *19*, 443.

42. de Castro Rocha, D.F.N.; da Cunha Rosa, L.R.; de Almeida Silva, C.; de Oliveira, B.R.; Martins, T.L.S.; Martins, R.M.B.; de Matos, M.A.; dos Santos Carneiro, M.A.; Soares, J.P.; de Oliveira e Silva, A.C.; et al. Epidemiology of HIV, Syphilis, and Hepatitis B and C among Manual Cane Cutters in Low-Income Regions of Brazil. *BMC Infect. Dis.* **2018**, *18*, 546. [CrossRef]
43. Jean Baptiste, A.E.; Chevalier, M.S.; Polo, E.; Noel, E.; Hulland, E.N.; Archer, W.R. Trends in Hepatitis B and Hepatitis C Seroprevalence among Blood Donors—Haiti, 2005–2014. *ISBT Sci. Ser.* **2018**, *13*, 150–157. [CrossRef] [PubMed]
44. Díaz, Y.M.S.; Orlando-Narváez, S.A.; Ballester-Arnal, R. Risk behaviors for HIV infection. A review of emerging trends. *Ciênc. Saúde Colet.* **2019**, *24*, 1417–1426. [CrossRef] [PubMed]
45. Torres, T.S.; Marins, L.M.S.; Veloso, V.G.; Grinsztejn, B.; Luz, P.M. How Heterogeneous Are MSM from Brazilian Cities? An Analysis of Sexual Behavior and Perceived Risk and a Description of Trends in Awareness and Willingness to Use Pre-Exposure Prophylaxis. *BMC Infect. Dis.* **2019**, *19*, 1067. [CrossRef]
46. Ministry of Health Epidemiological Bulletin. Viral Hepatitis | 2021 | Department of Diseases of Chronic Conditions and Sexually Transmitted Infections (Ministério da Saúde Boletim Epidemiológico. Hepatites Virais | 2021 | Departamento de Doenças de Condições Crônicas e Infecções Sexualmente Transmissíveis). Available online: <http://www.aids.gov.br/pt-br/pub/2021/boletim-epidemiologico-hepatites-virais-2021> (accessed on 1 May 2022).
47. Due to Lack of Contraceptives, Even Sex Is in Crisis in Venezuela (Por Falta de Contraceptivos, Até o Sexo Está Em Crise Na Venezuela—Jornal O Globo). Available online: <https://oglobo.globo.com/mundo/por-falta-de-contraceptivos-ate-sexo-esta-em-crise-na-venezuela-22127532> (accessed on 1 May 2022).
48. Condoms Are in Short Supply in Sub-Saharan Africa (Preservativos Estão Em Falta Na África Subsaariana). Available online: <https://unids.org.br/2019/04/faltam-preservativos-na-africa-subsaariana/> (accessed on 1 May 2022).
49. Pernica, F.Q. Religion, Morals, Culture, Politics and Sexuality (Religião, Moral, Cultura, Política e Sexualidade). Available online: <https://psicologado.com/atuacao/psicologia-social/religiao-moral-cultura-politica-e-sexualidade> (accessed on 1 May 2022).
50. Carvalho, J. Condoms Are Sold in Venezuela for R\$ 2068 (Camisinhas são vendidas na Venezuela por R\$ 2.068). Available online: <https://exame.com/economia/por-escassez-camisinhas-sao-vendidas-a-us-755-na-venezuela/> (accessed on 1 May 2022).
51. Pan American Health Organization/World Health Organization (PAHO/WHO) World Viral Hepatitis Day 2021. Available online: <https://www.paho.org/pt/campanhas/dia-mundial-luta-contra-hepatites-virais-2021> (accessed on 8 May 2022).
52. Presidency of the Republic; Civil House. Deputy Chief for Legal Affairs LAW No. 7649, of 25 January 1988 (Presidência da República; Casa Civil; Subchefia para Assuntos Jurídicos LEI Nº 7.649, DE 25 DE JANEIRO DE 1988). Available online: http://www.planalto.gov.br/ccivil_03/leis/1980-1988/17649.htm (accessed on 9 May 2022).
53. Ministry of Health. National Health Plan 2020–2023 (Ministério da Saúde; Plano Nacional de Saúde 2020–2023). Available online: https://bvsmms.saude.gov.br/bvs/publicacoes/plano_nacional_saude_2020_2023.pdf (accessed on 8 May 2022).
54. Federal Government Operation Welcome (Governo Federal Operação Acolhida). Available online: <https://www.gov.br/casacivil/pt-br/acolhida/acolhida> (accessed on 8 May 2022).
55. García, J.; Aburto, J.M. The Impact of Violence on Venezuelan Life Expectancy and Lifespan Inequality. *Int. J. Epidemiol.* **2019**, *48*, 1593–1601. [CrossRef]