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Research Article

Immunizations in Pediatric Patients Hospitalized at the Valera University Hospital "Dr. Pedro Emilio Carrillo"

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ABSTRACT

Introduction: Immunizations are one of the most effective public health strategies, even in hospitalized patients, because this setting presents a potential environment for increasing vaccination opportunities. Missed Opportunities for Vaccination (MOV) are quickly identified as factors contributing to poor immunization performance, especially in the hospital environment.

Objective: To evaluate the immunization profile of pediatric patients hospitalized in the Department of Pediatrics at the University Hospital of Valera "Dr. Pedro Emilio Carrillo," from February to May 2023.

Methods: Observational, descriptive study conducted through surveys of mothers and guardians of patients aged 1 month to 14 years and 11 months.

Results: Patients were separated by age group, and their vaccination status was assessed according to the schedule provided by the Expanded Program on Immunization (EPI) and the recommendations of the Venezuelan Society of Childcare and Pediatrics (SVPP). The reasons for missing immunizations and family socioeconomic status were also evaluated, demonstrating that even hospitalized patients with preventable risk factors still experienced missed opportunities for immunization.

Conclusion: A strong correlation continues to exist between missed opportunities for immunization and socioeconomic status, as well as a lack of awareness regarding the importance of vaccination. Therefore, it is a priority to expand research that studies the causes, factors, and repercussions of children's incomplete vaccination schedules on the public health of the rest of the population.

KEYWORDS
Immunization, Hospitalized pediatric patient, Missed vaccination opportunities.

Introduction

Immunizations are one of the most effective public health strategies for preventing infectious diseases, considered one of the greatest achievements of modern medicine [1-3]. Immunization is achieved through vaccination, given that a vaccine is a biological product used to achieve artificial active immunization [4,5]. The World Health Organization (WHO) reported in 2024 that more than 20 million children worldwide still do not have full access to immunizations, thus raising the possibility of a resurgence of vaccine-preventable diseases [6,7].

The Americas region is a world leader in the elimination, control, and prevention of vaccine-preventable diseases [7,8]. However, barriers exist in different segments of the population, which explain their lack of information and knowledge about the importance of vaccines and immunization [6]. There was a significant decrease in immunization coverage with the onset of the COVID-19 pandemic, leading to increased rates of measles, diphtheria, mumps, hepatitis B, meningitis, and yellow fever during 2020 and 2021, particularly in countries such as Brazil, Bolivia, Haiti, and Venezuela [9-12].

The American Academy of Pediatrics (AAP), within its guidelines, specifically includes a recommendation from the Committee on Immunization Practices to vaccinate hospitalized patients, as this setting presents a potential environment for increasing vaccination opportunities [1,10,11]. Immunization plays a significant role in a parent's healthy child; however, surprisingly, not all mothers choose to vaccinate their children, influenced by limited or nonexistent information [13-15]. Some consider vaccination beneficial, others view it as a form of harm to the body with detrimental effects, while many others do not vaccinate their children due to negligence or cultural factors, as they do not consider it a priority for child, family, and community health [2-4].

Despite multiple pieces of evidence supporting the effectiveness of Expanded Programs on Immunization (EPI) implemented at the WHO's suggestion to governments worldwide, vaccination coverage remains suboptimal, and underlying causes of immunization (OMOs) are quickly identified as contributing factors to poor immunization performance, especially in the hospital setting [14,15]. Given the importance of the above, the objective of this study was to evaluate the immunization profile of pediatric patients hospitalized in the Department of Pediatrics at the Dr. Pedro Emilio Carrillo University Hospital in Valera, from February to May 2023. Data collected included demographic characteristics, immunizations received, reasons for missing immunizations, and socioeconomic status, according to the modified Graffar scale.

Methods

This descriptive study was conducted using surveys of mothers and representatives of patients aged 1 month to 14 years and 11 months who were hospitalized in the Department of Pediatrics of the Valera University Hospital "Dr. Pedro Emilio Carillo", which includes the inpatient ward and pediatric emergency, from February to May 2023. From a universe of 295 representatives interviewed, 282 representatives of hospitalized patients were objectively selected to form the sample, according to the following inclusion criteria: patients hospitalized for any cause from 1 month to 14 years and 11 months of age, physical vaccination card of the patient and signed informed consent.

The assessment of vaccination status was described according to the Expanded Program on Immunization (EPI) of the Ministry of Popular Power for Health (MPPS), which includes more than 13 free vaccines offered to the population, including the BCG (Bacillus Calmette-Guérin) vaccine, hepatitis B vaccine, oral polio vaccine, intramuscular polio vaccine, COVID-19 vaccine, influenza vaccine, yellow fever vaccine, and the pentavalent vaccine (diphtheria, pertussis, tetanus, hepatitis B, and *Haemophilus influenzae type b). influenza* type b), MMR (measles, mumps, and rubella), rotavirus, pneumococcal 13 and 23- valent, and meningococcal. Also included were vaccines not yet included in the vaccination schedule by the EPI, such as varicella, hepatitis A virus (HAV), and human papillomavirus (HPV), which are recommended by the Venezuelan Society of Childcare and Pediatrics (SVPP) for the Venezuelan pediatric population [16].

The various risk factors attributed to non-vaccination in the children of the interviewed mothers were explored. These included: difficulty accessing vaccination centers, healthcare staff treatment, the child's chronic illness, parents' misconceptions about vaccination, vaccination schedules, forgetting the date of the corresponding vaccine, lack of knowledge about adverse effects, and other factors deemed relevant by the interviewee. Demographic data such as the patient's sex, age, and location were also collected.

In order to know the socioeconomic stratum of the family environment of the patients in question and its relationship with the vaccination status, a social stratification interview was carried out, according to the Graffar Method modified by Méndez Castellano, which considers four variables: profession of the head of the family, level of education of the mother, main source of income of the family and type of housing [17].

Statistical analysis of the data was performed using JASP 0.19.1 – 2024 software from the University of Amsterdam. Data were presented as measures of central tendency and dispersion. Pearson's chi-square test was used, and a p-value of 0.05 was considered statistically significant.

Results

Two hundred and ninety-five representatives of hospitalized patients were interviewed, of whom 282 met the inclusion criteria and agreed to participate by signing the informed consent form. Ninety-one point one percent were mothers and eight point eight percent were fathers. Of the patients studied, 55.3% were female and 44.68% were male. Patient age was distributed as follows: 7.8% were under 6 months of age, 13.47% were between 6 and 12 months, 4.25% were between 13 and 23 months, 41.84% were between 2 and 6 years of age, and 32.62% were over 7 years of age. The minimum age was one month and the maximum age was thirteen

years. The age distribution for infants under 6 months of age and preschoolers was statistically significant ($p < 0.05$). The origin of the families studied was described according to the location within and outside the city of Valera, Trujillo state: only 32.97% were local, 36.52% outside the city of Valera, but within the state of Trujillo and 30.49% outside the state locality, results that showed statistical significance ($p < 0.05$), see Table 1.

Risk factors for non-vaccination in the studied patients were evaluated (see Table 2). These included difficulty accessing vaccination centers in 32.97% of cases, the presence of a chronic illness in 1.06% of patients, misconceptions about vaccination in 15.85% of mothers, and forgetfulness of their children's vaccination dates in 72.69% of all guardians. Inconvenient work schedules and a lack of awareness of vaccine adverse effects were cited in 41.48% of cases. High vaccine costs, as vaccines not offered by the Ministry of Health's Expanded Program on Immunization (EPI) and only available in the private sector, were cited as the reason for non-immunization in 90.78% of cases. The absence of vaccines at health centers was cited in 10.63% of cases. Of the results obtained, only three were statistically significant ($p < 0.05$).

Table 1: Population distribution according to demographic characteristics.

Sex	Frequency	Percentage	P (Value)
Female	156	55.33	
Male	125	44.68	
AGE GROUP			
Children under 6 months	22	7.82	**< 0.05**
6 to 12 months	38	13.47	
13 to 23 months	12	4.25	
2 to 6 years	118	41.84	**< 0.05**
Ages 7 and up	92	32.62	
LOCALITY			
Local	93	32.97	**< 0.05**
State	103	36.52	**< 0.05**
Foreigners	86	30.49	**< 0.05**
TOTAL	282	100	

Table 2: Risk factors for the absence of vaccination.

Risk Factor	Frequency	Percentage	P (Value)
High Costs of Private Vaccines	256	90.78	**< 0.05**
Forgetting the vaccination date	205	72.69	
Lack of awareness of the adverse effects of vaccines	117	41.48	**< 0.05**
Inconvenient vaccination times	117	41.48	**< 0.05**
Difficulties accessing the vaccination center	93	32.97	
Misconceptions about vaccination	45	15.85	
Absence of vaccines in health centers	30	10.63	
Patient's chronic illness	3	1.06	**< 0.05**

According to the age-appropriate vaccination schedule, it was found that 100% of patients under 6 months of age had received the BCG vaccine. 40.90% had received the oral polio vaccine (OPV). Only 45.45% of patients had received the complete series of inactivated polio vaccine (IPV). None of the patients had received the 13-valent pneumococcal vaccine. 72.72% of cases had not received the rotavirus vaccine. Regarding the pentavalent vaccine, 90.90% of cases had received the complete series of doses for their age (Table 3).

For the 6-12 month age group, it was found that all had received the BCG vaccine. 97.36% had received all doses of the pentavalent vaccine. 47.36% had never received the OPV. Regarding the IPV, only 55.26% had received all doses. The influenza vaccine had never been received in 57.89% of cases. The rotavirus vaccine had one of the lowest coverage rates, with only 5.26% having received all doses (privately acquired). The MMR (measles, mumps, rubella) vaccine, on the other hand, was administered to 94.73% of patients. None of the patients had received any doses of the MR (measles, rubella) vaccine. As for the yellow fever vaccine, only 71.05% of patients had received the corresponding dose. The hepatitis A vaccine (antiHA) was administered in its first dose (at 12 months) in 21.05% of cases. The varicella vaccine (VA) was received by only 7.89%. The 13-valent pneumococcal vaccine was administered to only 2.63% of all patients (Table 4).

Table 3: Vaccination profile of patients aged 0-6 months.

Vaccine	Full Doses	Incomplete Doses	Not Received	Total
BCG	22 (100%)	0	0	100%
OPV	9 (40.90%)	13 (59.09%)	0	100%
Pentavalent	20 (90.90%)	2 (9.09%)	0	100%
IPV	10 (45.45%)	9 (40.91%)	3 (13.63%)	100%
Anti-rotavirus	5 (22.72%)	1 (4.54%)	16 (72.72%)	100%
Anti-influenza	0	0	22 (100%)	100%
13-valent pneumococcal vaccine	0	0	22 (100%)	100%

Table 4: Vaccination profile of patients aged 6-12 months.

Vaccine	Full Doses	Incomplete Doses	Not Received	Total
BCG	38 (100%)	0	0	100%
OPV	15 (39.47%)	5 (13.15%)	18 (47.36%)	100%
Pentavalent	37 (97.36%)	0	1 (2.63%)	100%
IPV	21 (55.26%)	12 (31.57%)	5 (13.15%)	100%
Anti-rotavirus	2 (5.26%)	5 (13.15%)	31 (81.57%)	100%
Anti-influenza	5 (13.15%)	11 (28.94%)	22 (57.89%)	100%
Trivalent viral	36 (94.73%)	0	2 (5.26%)	100%
Double viral	0	0	38 (100%)	100%
Anti-yellow fever	27 (71.05%)	0	11 (28.94%)	100%
Anti-HA	8 (21.05%)	2 (5.26%)	28 (73.68%)	100%
Anti-chickenpox	3 (7.89%)	0	35 (92.10%)	100%
13-valent pneumococcal vaccine	1 (2.63%)	0	37 (97.36%)	100%

Of the 12 patients aged 13 to 23 months studied, all had received the BCG vaccine. 58.33% had received all doses of the hepatitis B vaccine. 83.33% had received the complete OPV and IPV series. 75% had received the complete pentavalent vaccine series. 41.66% had never received the rotavirus vaccine. None of the patients had been vaccinated with the 13-valent pneumococcal conjugate

vaccine or the diphtheria-diphtheria vaccine (DV). The influenza vaccine was received in 41.66% of cases. 91.66% of the patients had received the yellow fever vaccine. Regarding the hepatitis A and varicella vaccines, only 41.66% of the patients had received both vaccines in full. Of this age group, 75% never received the meningococcal conjugate immunization (Table 5).

In the 2- to 6-year-old group, 97.45% of patients received the BCG vaccine. The complete OPV series was received by 88.13% of patients. The IPV series was administered in 93.22% of cases, with all doses completed. 33.89% received the complete rotavirus vaccine series. 89.83% of patients had never received the 13-valent pneumococcal vaccine. 43.22% of the group had not received the novel COVID-19 vaccine. 48.30% of patients received the corresponding yellow fever vaccine. The MMR vaccine was not administered in 55.08% of cases. The HA vaccine was never administered in 78.81% of patients. 78.81% had never received the varicella vaccine. The meningococcal conjugate vaccine was not administered in 83.05% of cases. The DV was administered in 87.28% of cases and was never administered (Table 6).

Table 5: Vaccination profile of patients aged 13-23 months.

Vaccine	Full Doses	Incomplete Doses	Not Received	Total
BCG	12 (100%)	0	0	100%
Anti-HB	7 (58.33%)	1 (8.33%)	4 (33.33%)	100%
OPV	10 (83.33%)	2 (16.16%)	0	100%
Pentavalent	9 (75%)	3 (25%)	0	100%
IPV	10 (83.33%)	2 (16.16%)	0	100%
Anti-rotavirus	4 (33.33%)	3 (25%)	5 (41.66%)	100%
Anti-influenza	5 (41.66%)	0	7 (58.33%)	100%
Trivalent viral	10 (83.33%)	0	2 (16.16%)	100%

Table 6: Vaccination profile from 2 to 6 years

Vaccine	Full Doses	Incomplete Doses	Not Received	Total
BCG	115 (97.45%)	0	3 (2.54%)	100%
OPV	104 (88.13%)	8 (6.77%)	6 (5.08%)	100%
Pentavalent	9 (75%)	3 (25%)	0	100%
IPV	110 (93.22%)	0	8 (6.77%)	100%
Anti-rotavirus	40 (33.89%)	46 (38.98%)	32 (27.11%)	100%
Anti-influenza	5 (41.66%)	0	7 (58.33%)	100%
Trivalent viral	21 (17.79%)	32 (27.11%)	65 (55.08%)	100%
Double viral	15 (12.71%)	0	103 (87.28%)	100%
Anti-COVID 19	10 (8.47)	57 (48.30%)	51 (43.22%)	100%
Anti-yellow fever	57 (48.30%)	0	61 (51.69%)	100%
Anti-HA	9 (7.62%)	16 (13.55%)	93 (78.81%)	100%
Anti-chickenpox	5 (4.23%)	20 (16.94%)	93 (78.81%)	100%
Anti-meningococcal conjugate	27 (22.88%)	9 (7.62%)	82 (83.05%)	100%
13-valent pneumococcal vaccine	15 (12.71%)	76 (64.40%)	27 (22.88%)	100%

In the last age group studied, corresponding to patients over 7 years old, it was found that 97.82% received the BCG vaccine. OPV booster doses were incomplete in 76.08% of patients. For IPV, 50% had not completed the full vaccination schedule. The pentavalent vaccine had the highest coverage, with 76.08% of patients receiving full doses and boosters. The influenza vaccine was administered in 54.43% of all cases. The diphtheria-diphtheria (DV) vaccine was not received in 75% of patients. The measles-mumps-rubella (MMR) vaccine was received in 66.30% of cases. The HPV vaccine, which is not included in the national immunization program (PAI) because it is only administered privately, was received incompletely in 1.08% of all patients. The yellow fever vaccine was received in 60.86% of patients in its single dose, while 83.69% had not received any doses of the hepatitis A vaccine. 89.13% of patients did not receive the varicella vaccine. 84.78% had never received the meningococcal vaccine. Regarding pneumococcal vaccines, 71.73% did not receive it (Table 7).

Table 7: Vaccination profile of patients over 7 years of age.

Vaccine	Full Doses	Incomplete Doses	Not Received	Total
BCG	90 (97.82%)	0	2 (2.17%)	100%
OPV	0	70 (76.08%)	22 (23.21%)	100%
Pentavalent	70 (76.08%)	12(12.04%)	10 (10.86%)	100%
IPV	15 (16.30%)	46 (50%)	31 (33.69%)	100%
Anti-rotavirus	27 (29.34%)	15 (16.30%)	50 (54.34%)	100%
Anti-influenza	51 (55.43%)	12 (13.04%)	29 (31.52%)	100%
Trivalent viral	51 (55.43%)	10 (10.86%)	31 (33.69%)	100%
Double viral	23 (25%)	0	69 (75%)	100%
23-valent pneumococcal vaccine	18 (19.56%)	43 (46.73%)	31 (33.69%)	100%
Anti-yellow fever	56 (60.86%)	31 (33.69%)	5 (5.43%)	100%
Anti-HA	0	15 (16.30%)	77 (83.69%)	100%
Anti-chickenpox	2 (2.17%)	8 (8.69%)	82 (89.13%)	100%
Anti-COVID 19	27 (29.34%)	12 (13.04%)	53 (57.60%)	100%
Anti-HPV	0	1 (1.08%)	91 (98.91%)	100%
Anti-meningococcal conjugate	4 (4.34%)	10 (10.86%)	78 (84.78%)	100%
13-valent pneumococcal vaccine	6 (6.52%)	20 (21.73%)	66 (71.73%)	100%

The evaluation of the socio-economic stratum according to Graffar modified by Méndez Castellanos, placed 92.19% in Graffar class V with a score of 17 to 20 points, placing them in the Extreme Poverty stratum; on the other hand, the remaining 7.80% were placed in Graffar class IV with a score of 13 to 16 points, considering them as the working stratum (Table 8).

Table 8: Socioeconomic characterization, according to Graffar modified by Méndez Castellanos.

STRATUM	FREQUENCY	PERCENTAGE
Yo	0	0
II	0	0
III	0	0
IV	22	7.80
V	260	92.19
TOTAL	282	100

Discussion

For a long time, research has been conducted worldwide on the attitudes and practices of parents and guardians regarding childhood immunizations [1,18]. The most significant risk factors for non-vaccination include: high costs of private vaccines, residence in rural areas, lack of knowledge about vaccine-preventable diseases, and the presence of illness in the child, as reported by Rugel [15]. In the present study, it was found that vaccination schedules, lack of awareness of adverse effects, and high vaccine costs are the most prevalent factors among the patients studied, similar to the findings reported by Montiel in Paraguay [14].

In the research conducted by Salomón et al. [19], the extent of vaccine coverage deficiencies in Venezuela is evident, according to WHO international recommendations. The study revealed that 74% of the population studied, including children, had coverage below the recommended 80% for DTP (diphtheria, tetanus, and pertussis) immunization. In the present analysis, the coverage range for the pentavalent vaccine is crucial, with 10% lacking at least one booster or having never received it. This contradicts the coverage standards proposed by the WHO for Latin American countries regarding immunizations included in the EPI (Expanded Program on Immunization), as reported by Avila et al. in early 2025 [20].

Regarding the absence of immunizations, the 13-valent pneumococcal, hepatitis A, varicella, measles, and influenza vaccines were the most frequently absent in the patients studied, similar to results reported by Gutierrez et al. [8] in a systematic and cross-sectional review, which showed a lack of hepatitis A, varicella, and 23-valent pneumococcal vaccines in patients aged 12 to 59 months. On the other hand, Bryan reported in a study on vaccines in hospitalized patients that the hepatitis B and influenza vaccines constituted the majority of the doses administered, respectively [21].

The socioeconomic level described in the present work places the surveyed representatives in the IV and V scale of the extreme poverty stratum and the working class stratum, figures that are not consistent with the report of the socioeconomic level of Araujo [22], who in his study placed the families of pediatric patients in the Graffar scale modified by Méndez, with social stratum IV predominating, which is equivalent to relative poverty, followed by stratum III of middle class.

An alarming number of incomplete vaccination profiles were found among hospitalized pediatric patients, lacking booster doses and vaccines included both within and outside the Venezuelan Expanded Program on Immunization (EPI). A strong correlation persists between the emergence of vaccine-related illnesses (VRIs) and socioeconomic status, as well as a lack of awareness regarding the importance of vaccination among Venezuelan children and adolescents. Therefore, it is a priority to expand objective, accurate, and population-based research to study the causes, factors, and repercussions of incomplete vaccination schedules in children on the public health of the rest of the population.

It is necessary to implement practical strategies in the reduction of MOV in the hospitalized population, because it represents a means to recover and update doses in patients with a lack of vaccines for their age, likewise, knowledge must be generated for the health personnel, who are in charge of pediatric care, at all levels, with the goal of updating their knowledge about immunizations in the pediatric population, since it is still a subject of debt to the population [23].

References

1. Shattock A, Johnson H, Yoon S, Carter A, Lambach PH, et al. Contribution of vaccination to improved survival and health: modeling 50 years of the Expanded Programme on Immunization. Lancet. 2024; 403:2307-2316.
2. Mihalek A, Kysh L, Pannaraj P. Pediatric Inpatient Immunizations: A literature review Hosp Pediatr. 2019; 9:550-559.
3. Mongua N, Delgado G, Ferreira E, Ferreyra L, Martínez M, et al. Vaccination in children under five years of age. Salud Publica Mex. 2024; 22:368-380.
4. Muyulema R, Guerrero E, Menlendres I. Vaccine knowledge in mothers with children under 5 years of age. Digital Postgraduate Journal. 2020; 9:1-11.
5. Neri M, Brassel B, Schirmacher H, Mendes D, Vyse A, et al. Vaccine-Preventable Hospitalizations from seasonal respiratory diseases: What Es Their True Valve? Vaccines. 2023; 11:1-12.
6. Tejada E, García C. Causes of non-compliance with the vaccination schedule of children under six years of age attending the outpatient clinic of the Dr. Robert Reid Cabral Children's Hospital. March-December, 2020. Doctoral thesis. National District. Pedro Henríquez Ureña National University. 2021; 20.
7. Dombou A, Noukev D, Whegang S, Ateudjiev J. Timelines and missed opportunities for vaccination among children aged 0 to 23 months in Dshang health district, West region, Cameroon: A cross-sectional survey. PLOS Glob Public Health. 2023; 3:1-13.
8. Gutierrez J, Johri M. Socioeconomic and geographic inequities in vaccination among children 12 to 59 months. Rev Panam Public Health. 2023; 1:1-8.
9. Cuzulan J, Wüst M. Reminder design and childhood vaccination coverage. J Health Econ. 2024; 93:1-10.
10. Bellizi S, Pichierri G, Kheirallah K, Panu C. Global Health priorities: repositioning routine immunization for infants. J Infect Dev Ctries. 2022; 16:1648-1649.
11. Bryan M, Hofstetter A, Opel D, Simon T. Vaccine Administration in Children's Hospitals. Pediatrics. 2022; 148:31-43.
12. https://educacionysaludholistica.org/wp-content/uploads/2015/02/ESCALA-DE-ESTRATIFICACION-SOCIAL-DE-GRAFFAR-MODIFICADO.pdf
13. Rugel N. Factors that influence vaccination compliance in children under 5 years of age. Undergraduate thesis. Milagro. State University of Milagro. 2020; 13.
14. Montiel C. Factors that influence compliance with the vaccination schedule in children under 5 years of age. Undergraduate thesis. Hernandarias, Paraguay. Intercontinental Technological University. 2023; 63.
15. Gallardo D, Jiménez J. Knowledge of mothers of children under 5 years of age regarding the vaccination schedule. Rev Allerg Mex. 2024; 71:108-113.

16. https://www.svpediatria.org/img/secciones/esquema-de-inmunizacion/documento/ESQUEMA_DE_INMUNIZACIONES_junio_2024.pdf
17. Méndez-Castellano H, de Méndez M. Society and stratification. Graffar-Méndez Castellano Method. Fundacredesa. Caracas. 1994.
18. Tampi M, Carrasco-Labra A, O'Brien K, Velandia-González M, Brignardello -Petersen R. Systematic review on reducing missed opportunities for vaccinations in Latin America. Rev Panam Public Health. 2022; 46:46-65.
19. https://factor.prodavinci.com/mapaderiesgovacunal/index.html
20. Avila M, Brenes H, Melgar M, Becerra F, Chacon E, et al. Zero-dose children in Latin America: analysis of the problem and possible solutions. F1000Res. 2025; 27:1-16.
21. Marcano A. Vaccines and their knowledge among postgraduate residents. Specialization thesis. Caracas. Central University of Venezuela. 2019; 25.
22. Araujo R. Immunization profile of patients aged one to five years admitted to the Valera University Hospital "Dr. Pedro Emilio Carrillo". September 2021. Undergraduate thesis. Valera. National Experimental University "Francisco de Miranda". 2022; 27.
23. Bryan M, Mihalek A. Gaps in Immunizing Children During Hospitalization: How Can We Close them? Hosp Pediatrician. 2024; 14:391-393.