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REVIEW

Systemic analysis of the vaccination program in Argentina

Análisis sistémico del programa de vacunación en Argentina

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ABSTRACT

Introduction: The paper discusses the historical evolution and importance of vaccines in public health. The key role of vaccines and drinking water in preventing infectious diseases since the 19th century is highlighted. It mentions how epidemics such as poliomyelitis in Argentina boosted vaccine research and development. In addition, the shared responsibility between scientists, vaccine developers and the population is emphasized, highlighting the importance of public health policies and awareness.
Methods: A qualitative study was conducted with a systematic review of scientific literature. Sources included data from WHO, the Argentine Ministry of Health, scientific papers, and surveys, with a focus on sociodemographic parameters and living conditions. The analysis focused on a historical-logical approach to interpret the data.
Results: The results show significant advances in the Argentine vaccination program, especially in the pediatric population. There was a notable reduction in the number of unvaccinated children from 2021 to 2022, and increases in DTP and HPV vaccine coverage. There was a historic decrease in the incidence of influenza and in the infant mortality rate since 1990. The measles outbreak in 2020 was associated with low vaccination coverage in 2019. During the COVID-19 pandemic, there was a low post-vaccination infection rate and zero deaths in fully vaccinated individuals. In addition, an increase in life expectancy since 1990 was noted.
Conclusions: Vaccines are fundamental in public health, evidenced by the improvement in vaccination coverage and the decrease in the prevalence of infectious diseases and infant mortality in Argentina. Awareness campaigns and public health policies have been crucial. However, misinformation remains a challenge. Global collaboration, such as that of WHO, is key to improving vaccination coverage and addressing emerging challenges such as COVID-19 and Ebola. Immunization remains an essential tool to prevent disease and save lives worldwide.

Keywords: Immunization; Public Health; Strategic Planning.

RESUMEN

Introducción: el artículo aborda la evolución histórica y la importancia de las vacunas en la salud pública. Se destaca el rol clave de las vacunas y el agua potable en prevenir enfermedades infecciosas desde el siglo XIX. Se menciona cómo epidemias como la poliomielitis en Argentina impulsaron la investigación y desarrollo de vacunas. Además, se enfatiza la responsabilidad compartida entre científicos, desarrolladores de vacunas y la población, subrayando la importancia de las políticas de salud pública y la concientización.
Métodos: se realizó un estudio cualitativo con una revisión sistemática de literatura científica. Las fuentes incluyen datos de la OMS, el Ministerio de Salud de Argentina, artículos científicos, y encuestas, con un enfoque en parámetros sociodemográficos y condiciones de vida. El análisis se enfocó en un enfoque histórico-lógico

para interpretar los datos.
Resultados: los resultados muestran avances significativos en el programa de vacunación argentino, especialmente en la población pediátrica. Hubo una reducción notable en la cantidad de niños sin vacunas desde 2021 a 2022, y aumentos en la cobertura de vacunas DTP y VPH. Se observó una disminución histórica en la incidencia de gripe y en la tasa de mortalidad infantil desde 1990. El brote de sarampión en 2020 se relacionó con una baja cobertura de vacunación en 2019. Durante la pandemia de COVID-19, se registró una baja tasa de infección post-vacunación y cero muertes en individuos completamente vacunados. Además, se notó un aumento en la esperanza de vida desde 1990.
Conclusiones: las vacunas son fundamentales en la salud pública, evidenciado por la mejora en la cobertura de vacunación y la disminución en la prevalencia de enfermedades infecciosas y mortalidad infantil en Argentina. Las campañas de concientización y las políticas de salud pública han sido cruciales. Sin embargo, la desinformación sigue siendo un desafío. La colaboración global, como la de la OMS, es clave para mejorar la cobertura vacunal y enfrentar desafíos emergentes como el COVID-19 y el ébola. La inmunización sigue siendo una herramienta esencial para prevenir enfermedades y salvar vidas a nivel mundial.

Palabras clave: Vacunación; Salud Pública; Planificación Estratégica.

INTRODUCTION

In the 19th century, the transmission routes of infectious diseases were uncovered, which, along with scientific research, allowed for the development of preventive instruments, with vaccines and drinking water emerging as the most impactful interventions.[1,2,3,4]

The impulse generated by the need to eliminate a disease initiates a motivation for the research and development of vaccines aimed at prevention; this was the case during the peak of the poliomyelitis epidemic in the Republic of Argentina in 1956, leading to the development of the first vaccines for this disease.[5,6,7,8]

In turn, not everything is the responsibility of scientists, laboratories, and vaccine developers, but also involves the general population. By establishing public health policies focused on raising awareness and implementing a comprehensive vaccination plan, the objective is to foster societal commitment to their application, thereby achieving the goal of reducing the incidence rate of vaccine-preventable diseases.[9,10,11,12,13]

Every year, there is a noticeable increase in participation, both from the society and professional personnel, in disseminating and raising awareness about the importance of vaccines. Through this medium, we aim to reinforce the concept of immunization, as well as demonstrating that some cases of misinformation can lead to new outbreaks of preventable diseases. Additionally, we question about what weaknesses exist in the system, with a focus on our country.

METHODS

A qualitative study was conducted, involving a systematic review of scientific literature available in the World Health Organization (WHO) database, official bulletins from the Ministry of Health of the Republic of Argentina, scientific papers, and vaccination campaigns, focusing on data obtained from surveys and interviews, as well as statistics encompassing sociodemographic parameters such as age, sex, types of vaccines in Argentina and globally,[14] and living conditions and situations, selected randomly. An interpretative analysis was applied with a historical-logical approach.

RESULTS AND DISCUSSION

In terms of national statistics, the results obtained with a focus on the pediatric population in recent years yielded encouraging values.

The number of children who did not receive any vaccine, often referred to as “zero-dose”, decreased from 18,1 million in 2021 to 14,3 million in 2022, almost the pre-pandemic value of 12,9 million in 2019.

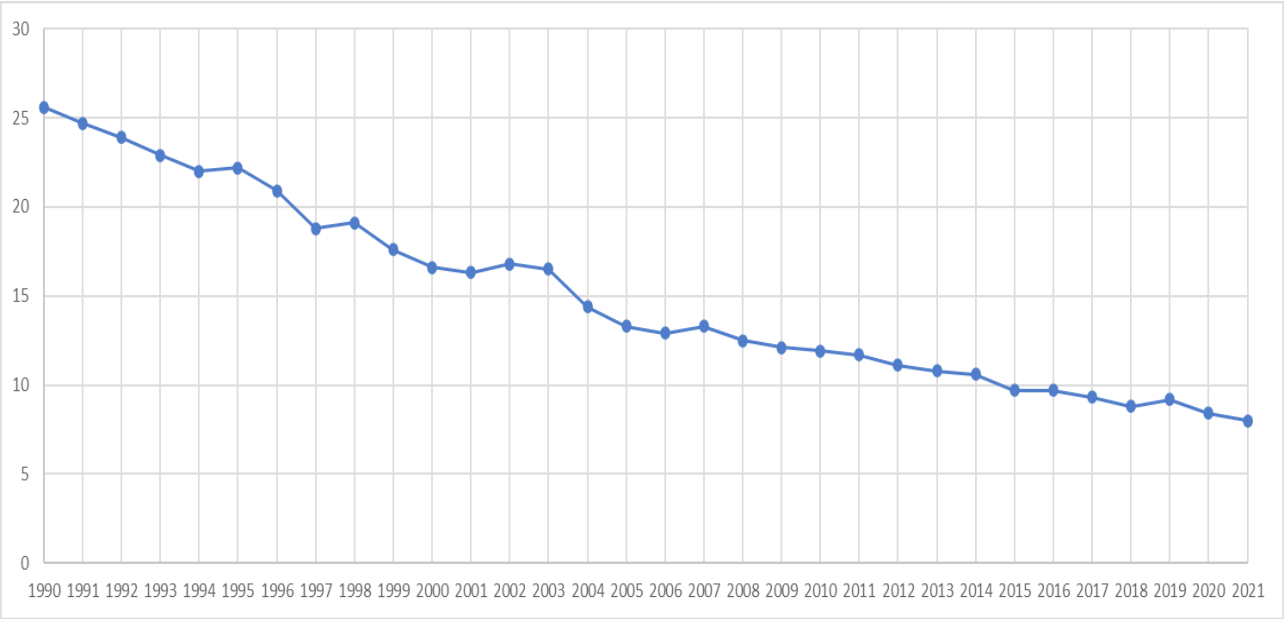
The vaccination coverage for the three doses of DTP (vaccine against diphtheria, tetanus, and pertussis) rebounded from 81 % in 2021 to 84 % in 2022.

The global vaccination coverage with the first dose of the Human Papillomavirus (HPV) vaccine in girls rose from 16 % in 2021 to 21 % in 2022.

Thirty years ago, the incidence of influenza in children under two years of age stood at 80%, and with the introduction of vaccination, this rate has significantly decreased to 15%.[15,16]

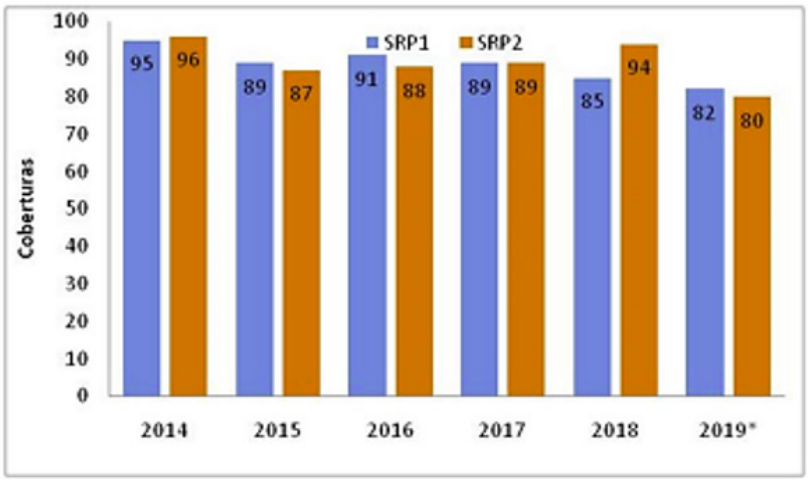
Infant mortality rate:

- Year 1990: 25,6 per 1 000 live births.
- Year 2021: 8,0 per 1 000 live births.



Source: https://opendata.paho.org/
Figure 1. Infant mortality rate in Argentina (1990 to 2021)

Analyzing the Measles outbreak in Argentina in 2020, the vaccination statistics from the previous year indicated a decline in the coverage rate, falling below 80 %. This decline in coverage helps explain the peak in positive cases, with a predominance in children under 1 year old.



Source: Directorate of Vaccine-Preventable Diseases Control. Ministry of Health
Figure 2. Measles vaccination coverage in Argentina (2014-2019)

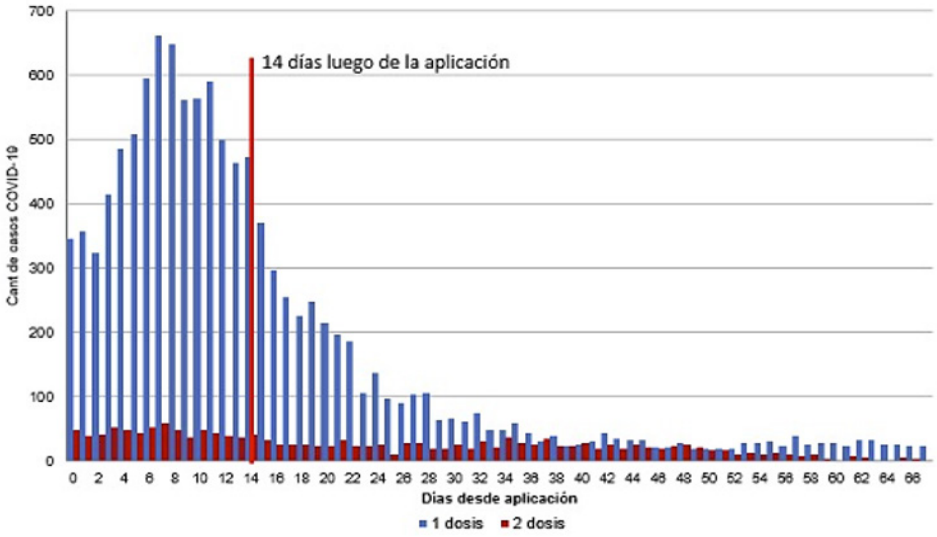
On the other hand, following the vaccination schedule during the COVID-19 pandemic, the statistical results showed that out of the 650,071 individuals who had received both doses, an estimated 1,003 of them tested positive after 14 days of the second dose, representing 0,15 %. Health authorities also reported that no deceases have been recorded among individuals with two vaccine doses.[17,18,19]

Regarding life expectancy at birth, analyzed between 1990 and 2021, a noteworthy increase in years of life is observed. In 1990, the average life expectancy for adults in Argentina was 71,78 years, while in the year 2021, it has propitiously increased to 75,39 years.

Decrease in the Unvaccinated Pediatric population

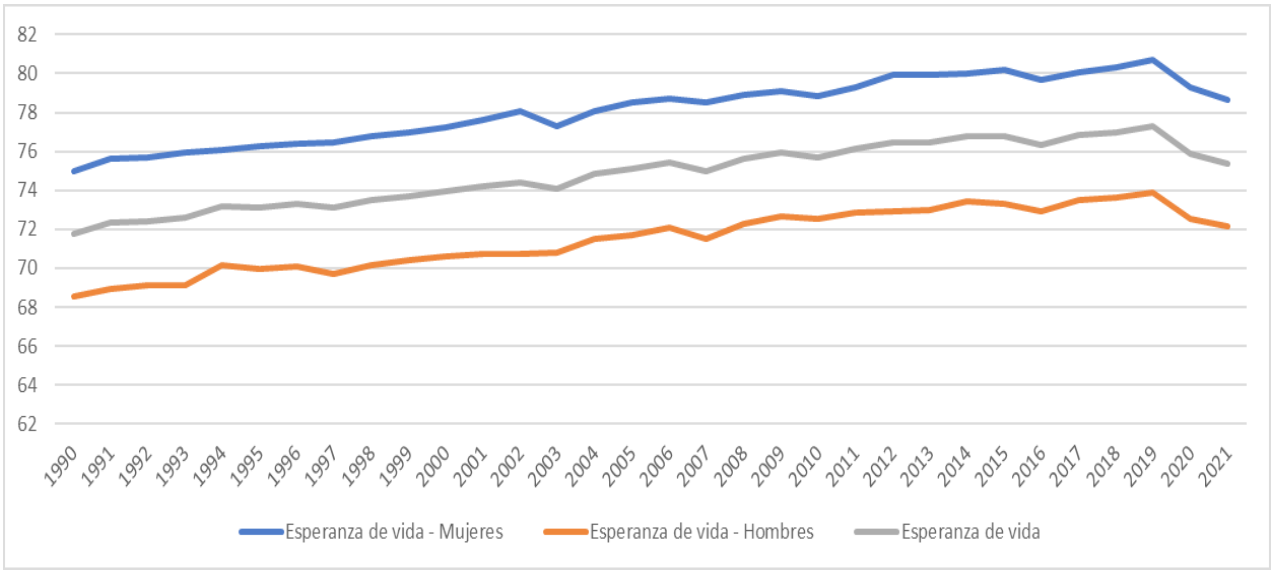
The reduction in the number of children not receiving any vaccine, or those called “zero-dose”, from 18,1 million in 2021 to 14,3 million in 2022, is a crucial indicator of the success of the vaccination program in Argentina, particularly in the context of recovering from the COVID-19 pandemic. This achievement not only signifies a significant improvement compared to the previous year, but also marks a return to figures closer to

pre-pandemic normality.



Source: Ministry of Health. Argentina.

Figure 3. Individuals vaccinated with two doses for COVID-19 and positive cases



Source: https://opendata.paho.org/

Figure 4. Life expectancy in Argentina (1990 – 2021)

This shift could be the result of a combination of factors, including increased public awareness of the importance of vaccines, improved distribution and accessibility thereof, and greater confidence in the healthcare system.[20,21,22] This progress is fundamental, given that childhood vaccination is essential for preventing serious diseases and fostering the development of lasting collective immunity.

Recovery in DTP and HPV Coverage

The rise in vaccination coverage for DTP and the first dose against HPV is another positive aspect. The recovery of DTP vaccine coverage from 81 % in 2021 to 84 % in 2022, and the increase in HPV vaccine coverage from 16 % to 21 % during the same period, reflect a notable strengthening in the implementation of the pediatric vaccination program in Argentina. These data suggest that efforts to increase awareness and access to these vaccines are yielding results.

The enhancement in HPV vaccine coverage is particularly significant, considering the crucial role this vaccine plays in the prevention of cervical cancer, a major cause of female mortality in many countries.[23,24,25]

Historical Impact of Vaccination on the Reduction of Influenza Incidence and Infant Mortality

The long-term impact of vaccination is clearly evident in the reduction of influenza incidence in children

under two years from 80 % to 15 % over three decades, and in the decrease in the infant mortality rate from 25,6 per 1 000 live births in 1990 to 8,0 in 2021. These results stand as a testimony to the transformative power of vaccines in radically changing public health.

The drastic reduction in infant mortality and the prevalence of diseases like influenza not only improves the quality of life and life expectancy of individuals but also brings about a positive socio-economic impact, reducing the burden on the healthcare system and enhancing overall societal productivity.[26]

Relationship between Low Vaccination Coverage Rates and Disease Outbreaks

The analysis of the measles outbreak in 2020, linked to a vaccination coverage rate lower than 80 % in the previous year, underscores the critical importance of achieving and maintaining high vaccination coverage rates.

This example highlights the direct relationship between low coverage rates and the resurgence of previously controlled diseases. Ensuring high coverage rates is fundamental to prevent outbreaks and safeguard the most vulnerable populations, such as children under one year old in this case.[27]

Effectiveness of COVID-19 Vaccination

The results obtained during the COVID-19 pandemic, where only 0.15% of fully vaccinated individuals were infected, and no deceases were recorded, underscore the effectiveness of the COVID-19 vaccine.

This not only reflects the success of the specific COVID-19 vaccination program in Argentina, but also underscores the importance of vaccination as a key tool in the fight against pandemics and infectious diseases.[17]

Increase in Life Expectancy

Finally, the increase in life expectancy from 1990 to 2021, rising from 71.78 years to 75.39 years, is the result of multiple factors, partly reflecting the success of vaccination programs and other improvements in healthcare.

Vaccination significantly contributes to disease prevention and health promotion, which, in turn, can lead to a longer and healthier life.[28,29,30]

Limitations and prospects

While this article solely relies on secondary sources, the findings obtained in this study globally reflect not only the effectiveness of the vaccination program in Argentina but also the importance of vaccination as a fundamental tool in public health promotion. These data highlight the need to maintain and strengthen vaccination strategies, and to continue research and monitoring to ensure the adaptability and effectiveness of the program in the face of new public health challenges.

CONCLUSIONS

According to the mentioned data, it can be concluded about the importance of vaccines in terms of public health, emphasizing their correct distribution, administration, and epidemiological surveillance in both the pediatric and adult populations, just as individuals with risk factors, such as those diagnosed with diabetes and hypertension. Therefore, the implementation of the national vaccination program contributes to the reduction and considerable control regarding the possibilities of contracting preventable diseases.

The relevance of dissemination through campaigns in schools and mass media, aimed at the population, is highlighted to promote awareness of the importance of vaccination and encourage complete schedules for expected immunization.

Stating that health policies are devised and focused on promotion and prevention activities, vaccination stands out as a key milestone, and consequently the prevention of diseases categorized as Notifiable Diseases (NOD). It is essential to raise awareness of the existence of misinformation about vaccines, such as that circulating on social media, which generates a wide controversial impact, increasing the risk and challenging the management of strategic planning in matters of controlling and evaluating, in epidemiological terms, the transmission of diseases that can be prevented through vaccination.[7]

Since their discovery, vaccines have been a crucial measure to prevent the spreading of diseases. According to WHO data, between 2 and 3 million deaths are avoided yearly thanks to the immunization provided by vaccination.

WHO collaborates with countries and partners to enhance global vaccine coverage, particularly through initiatives adopted by the World Health Assembly.

The immunization agenda establishes an ambitious strategy worldwide in matters of vaccines and immunization, created, among other things, with various contributions from countries and organizations globally. It draws on lessons learned from the last decade and addresses new and persistent challenges posed

by infectious diseases such as Ebola or COVID-19.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

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