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Prevalence of immunization among children zero to twelve months old in the rural health unit of Santo Tomas, Davao del Norte: A retrospective analysis

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Abstract

Background: The prevalence of immunization in the Philippines has steadily improved over the years, with the country achieving high coverage rates for many of its vaccination programs. According to the World Health Organization (2023), the Philippines has a national immunization coverage of 86% for the third dose of Diphtheria-Pertussis-Tetanus (DPT3) vaccine, which is above the global target of 80%. The most commonly administered vaccines in the country include those for diseases such as measles, polio, tetanus, and tuberculosis [1]. These vaccines are given to children as part of the routine immunization schedule recommended by the DOH [2]. This is a study on the prevalence of immunization of children aged zero to twelve months in Barangay Santo Tomas, Davao del Norte, Philippines and the result of this study reflects the immunization status in the said part of the country.

Methods: For this study, the researchers used retrospective type of study. A retrospective research design is a type of research study that looks back in time to analyze data that has already been collected [3]. The researchers gather data from existing sources, such as medical records, the data collected from 2020 to 2022. Retrospective studies are often used to answer questions about the relationship between past exposures or variables and specific outcomes. Researchers seek to identify associations, patterns, or correlations in historical data. Retrospective studies are often more cost-effective and quicker to conduct than prospective studies, as they rely on existing data. With the use of this method, the researchers attempted to analyze, interpret and report the present status of immunization of children aged zero to twelve months old in Santo Tomas, Davao del Norte.

Results: There are more males than females that have been vaccinated by BCG, Hepatitis B, DPT 1, DPT 2, DPT 3, OPV 1, OPV 2, OPV 3, IPV, PCV 1 PCV 2 and PCV 3 from year 2020 to year 2022 with the difference of 297 for BCG male, 242 for HEPA B male, 197 for DPT 1 male, 208 for DPT 2 male, 238 for DPT 3 male, 236 for OPV 1 male, 179 OPV 2 male, 248 for OPV 3 male, 269 for IPV male, 237 for PCV 1 male, of 260 for PCV 2 male, and 120 for PCV 3 male. For MMR there are more females than males that have been vaccinated from year 2020 to year 2022 with the difference of 25 females. DPT 3 is the highest availed vaccine by male and MMR vaccine by female from 2020 to 2022. OPV 2 is the lowest availed vaccine by male and OPV 3 by female from 2020 to 2022. DPT 3 is the highest availed vaccine by male and MMR vaccine by female from 2020 to 2022. OPV 2 is the lowest availed vaccine by male and OPV 3 by female from 2020 to 2022.

Conclusion: There is no statistically significant difference in the prevalence of immunization between males and females among infants aged 0-12 months for the years 2020, 2021, and 2022. This study emphasizes the dynamic nature of vaccination coverage, influenced by changes in the eligible population and varying rates of coverage for individual vaccines. The observed decline in fully immunized percentages calls for targeted interventions and strategies to address gaps in immunization coverage.

Keywords: Prevalence; Immunization; Zero to Twelve Months Old; Santo Tomas; Davao del Norte

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1. Introduction

Immunization is the process of protecting individuals from infectious diseases by administering vaccines that stimulate the body's immune system to produce antibodies against specific diseases. It is considered one of the most successful and cost-effective public health interventions, saving millions of lives every year.

In the Philippines, immunization is a vital component of the national health program, with the goal of reducing the burden of vaccine-preventable diseases. The Department of Health (DOH) is responsible for the implementation of the country's National Immunization Program (NIP), which aims to provide access to safe, effective, and affordable vaccines to all Filipinos.

The prevalence of immunization in the Philippines has steadily improved over the years, with the country achieving high coverage rates for many of its vaccination programs. According to the World Health Organization (2023), the Philippines has a national immunization coverage of 86% for the third dose of Diphtheria-Pertussis-Tetanus (DPT3) vaccine, which is above the global target of 80% [4].

The most commonly administered vaccines in the country include those for diseases such as measles, polio, tetanus, and tuberculosis. These vaccines are given to children as part of the routine immunization schedule recommended by the DOH.

This is a study on the prevalence of immunization of children aged zero to twelve months in Barangay Santo Tomas, Davao del Norte, Philippines and the result of this study reflects the immunization status in the said part of the country.

2. Methods

2.1. Study design and sites

The study is retrospective attempting to analyze, interpret and report the present status of immunization of children aged zero to twelve months old in the Rural Health Unit of Santo Tomas, Davao del Norte.

2.2. Purposive sampling under nonprobability

The researchers used retrospective type of study which is a type of research study that looks back in time to analyze data that has already been collected. The researchers gather data from existing sources, such as medical records, the data collected from 2020 to 2022. Retrospective studies are often used to answer questions about the relationship between past exposures or variables and specific outcomes. Researchers seek to identify associations, patterns, or correlations in historical data. Retrospective studies are often more cost-effective and quicker to conduct than prospective studies, as they rely on existing data. With the use of this method, the researchers attempted to analyze, interpret and report the present status of immunization of children aged zero to twelve months old in Santo Tomas, Davao del Norte.

2.3. Data collection procedure

The researchers collated the data gathered from the medical record of Rural Health Unit and sorted them into relevant categories. The data was then analyzed and the researchers used the percentage system and ranking system in presenting the data. The data were tabulated and presented in different tables according to different categories so as to present a clear picture of the status of immunization of children in Santo Tomas, Davao del Norte ages zero to twelve months old.

2.4. Statistical Analyses

For the treatment of data, the results from the collated medical records of the immunization of children aged zero to twelve months from the Rural Health Unit of Sto. Tomas, Davao del Norte were analyzed. The statistical formula that was applied in the computation is the following: (1) Percentage, which was applied on the variables of the personal profile of the children aged zero to twelve months old who had immunization at the Rural Health Unit of Santo Tomas, Davao del Norte with the formula percentage being equal to frequency multiplied by 100 all over the total number of eligible populations; Mean, which was computed in order to establish analysis on the average of male or female children zero to twelve years old who received the vaccination at the Rural Health Unit of Santo Tomas, Davao del Norte with the formula mean being equal to the sum of values divided by the number of values; and, Chi-square test which was done

by using Jamovi 2.3.28 application to observe the association between demographic profile and the prevalence of immunization among infants 0-12 months from 2020-2022.

2.5. Ethical Consideration

As the nature of this study is retrospective, we have gathered already available data from the Rural Health Unit of Barangay Santo Tomas, Davao del Norte. The most important consideration is maintaining confidentiality and privacy of all participants' personal and health information. This includes properly storing and securing the data collected, as well as using de-identified data for reporting and analysis to protect the privacy of individuals. Anonymity of the individuals in the population group is carefully regarded. Furthermore, researchers are aware of and respectful of cultural norms and practices in gathering data. This includes obtaining appropriate permissions from RHU leaders and involving local stakeholders in the development and implementation of the data.

3. Results

The following are presentations and interpretations of the study using tables for the data that gathered in immunization program for infants aged 0–12-month-old from the year 2020 to 2022 from the Rural Health Unit of Santo Tomas, Davao Del Norte.

Table 1 shows the demographic profile by gender. The table shows that there are more males than females that have been vaccinated by BCG, Hepatitis B, DPT 1, DPT 2, DPT 3, OPV 1, OPV 2, OPV 3, IPV, PCV 1 PCV 2 and PCV 3 from year 2020 to year 2022 with the difference of 297 for BCG, 242 for HEPA B, 197 for DPT 1, 208 for DPT 2, 238 for DPT 3, 236 for OPV 1, 179 OPV 2, 248 for OPV 3, 269 for IPV, 237 for PCV 1, of 260 for PCV 2, and 120 for PCV 3 in males. For MMR there are more females than males that have been vaccinated by from year 2020 to year 2022 with the difference of 25 in females. DPT 3 is the highest availed vaccine by males and MMR vaccine by females from 2020 to 2022. OPV 2 is the lowest availed vaccine by males and OPV 3 by females from 2020 to 2022. DPT 3 is the highest availed vaccine by males and MMR vaccine by females from 2020 to 2022. OPV 2 is the lowest availed vaccine by males and OPV 3 by females from 2020 to 2022.

Table 1 Demographic Profile by Gender

VACCINE	**YEAR 2020**		**YEAR 2021**		**YEAR 2022**		**TOTAL**	
0-12 MONTHS	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
BCG	1085	970	692	672	950	788	2727	2430
HEPA B	1095	966	693	695	932	817	2720	2478
DPT 1	1006	947	765	724	976	879	2747	2550
DPT 2	1066	1021	759	727	988	857	2813	2605
DPT 3	1072	983	776	715	975	857	2823	2585
OPV 1	868	791	775	721	981	876	2624	2388
OPV 2	848	817	751	733	970	840	2569	2390
OPV 3	811	744	805	741	976	859	2592	2344
IPV 1	991	909	820	769	968	832	2779	2510
MMR	1072	1124	818	770	911	932	2801	2826
PCV 1	1011	938	758	709	971	856	2740	2503
PCV 2	1073	993	757	720	990	847	2820	2560
PCV 3	1020	968	749	680	868	869	2637	2517

Table 2 shows the prevalence of immunization among infants 0- 12 months from the year 2020 to 2022 in terms of the following vaccines BCG, Hepatitis B, DPT1, DPT2, DPT3, OPV1, OPV2, OPV3, IPV, PCV1, PCV2, PCV3, MMR, Full immunization. The Table shows that BCG and HEPA B these vaccines showed significant declines in coverage from 2020

to 2021 but a slight increase in 2022. BCG coverage dropped from 82.5% to 35.4% in 2021 and then increased to 70.7% in 2022. HEPA B followed a similar trend, with a drop from 82.7% to 36.0% in 2021 and an increase to 68.3% in 2022.DPT 1, DPT 2, and DPT 3 showed an increase in coverage over the three years. DPT 1 increased from 78.4% in 2020 to 75.5% in 2022. OPV 1, OPV 2, and OPV 3 all showed increasing coverage rates over the years. OPV 3 had the highest coverage in 2022 at 74.7%. Both IPV 1 and MMR had higher coverage in 2022 compared to 2020, with MMR reaching 75.0% in 2022. PCV 1 and PCV 2 showed increases in coverage from 2020 to 2022, with PCV 2 reaching 74.8% in 2022. However, PCV 3 had a decrease in coverage from 79.8% in 2020 to 70.7% in 2022. The percentage of the population fully immunized increased from 77.8% in 2020 to 73.7% in 2022, with a dip in coverage in 2021.

Table 2 Prevalence of immunization among infants 0- 12 months from the year 2020 to 2022 in terms of the following vaccines BCG, Hepatitis B, DPT1, DPT2, DPT3, OPV1, OPV2, OPV3, IPV, PCV1, PCV2, PCV3, MMR, Full immunization

VACCINE	**2020 With Eligible Population (2490)**	**%**	**2021 With Eligible Population (3845)**	**%**	**2022 With Eligible Population (2455)**	**%**
BCG	2055	*82.5*	1364	*35.4*	1738	*70.7*
HEPA B	2061	*82.7*	1388	*36.0*	1677	*68.3*
DPT 1	1953	*78.4*	1489	*38.7*	1855	*75.5*
DPT 2	2087	*83.8*	1486	*38.6*	1845	*75.1*
DPT 3	2055	*82.5*	1491	*38.7*	1862	*75.8*
OPV 1	1659	*66.6*	1496	*38.9*	1857	*75.6*
OPV 2	1665	*66.8*	1484	*38.5*	1810	*73.7*
OPV 3	1555	*62.4*	1546	*40.2*	1835	*74.7*
IPV	1900	*76.3*	1589	*41.3*	1800	*73.3*
MMR	2196	*88.1*	1588	*41.3*	1843	*75.0*
PCV 1	1949	*78.2*	1467	*38.1*	1827	*74.4*
PCV 2	2066	*82.9*	1477	*38.4*	1837	*74.8*
PCV 3	1988	*79.8*	1429	*37.1*	1737	*70.7*
FULLY IMMUNIZED	*1938*	*77.8*	*1484*	*38.6*	*1809*	*73.7*

Table 3 shows the association in the prevalence of immunization between males and females among infants aged 0-12 months for the years 2020, 2021, and 2022. The table shows that the p value of all vaccine for both gender from 2020 to 2022 is greater than alpha value (α=0.05) therefore there is no statistically significant difference in the prevalence of immunization between males and females among infants aged 0-12 months for the years 2020, 2021, and 2022.

Table 3 The association in the prevalence of immunization between males and females among infants aged 0-12 months for the years 2020 to 2022

VACCINE	**YEAR 2020**		**YEAR 2021**		**YEAR 2022**		**p value**
0-12 MONTHS	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	
BCG	1085	970	692	672	950	788	0.093
HEPA B	1095	966	693	695	932	817	0.112
DPT 1	1006	947	765	724	976	879	0.72
DPT 2	1066	1,021	759	727	988	857	0.225

DPT 3	1072	983	776	715	975	887	0.983
OPV 1	868	791	775	721	981	876	0.84
OPV 2	848	817	751	733	970	840	0.159
OPV 3	811	744	805	741	976	859	0.764
IPV 1	991	909	820	769	968	832	0.412
MMR	1072	1,124	818	770	911	932	0.241
PCV 1	1011	938	758	709	971	856	0.638
PCV 2	1073	993	757	720	990	847	0.273
PCV 3	1020	968	749	680	868	869	0.387

4. Discussions

The current data shows that there are more males than females that have been vaccinated by BCG, Hepa B, DPT 1, DPT 2, DPT 3, OPV 1, OPV 2, OPV 3, IPV, PCV 1 PCV 2 and PCV 3 from year 2020 to year 2022 with the difference of 297 for BCG, 242 for HEPA B, 197 for DPT 1, 208 for DPT 2, 238 for DPT 3, 236 for OPV 1, 179 OPV 2, 248 for OPV 3, 269 for IPV, 237 for PCV 1, of 260 for PCV 2, and 120 for PCV 3 in males. For MMR there are more females than males that have been vaccinated from the year 2020 to the year 2022 with the difference of 25 in females. DPT 3 is the highest availed vaccine by males and MMR vaccine by females from 2020 to 2022. OPV 2 is the lowest availed vaccine by males and OPV 3 by females from 2020 to 2022. DPT 3 is the highest availed vaccine by males and MMR vaccine by females from 2020 to 2022. OPV 2 is the lowest availed vaccine by males and OPV 3 by females from 2020 to 2022. Immunization is among the most cost-effective public health interventions available and is estimated to have averted at least 37 million deaths between 2000 and 2019. Since the establishment of the Expanded Program on Immunization in 1974, global vaccination coverage increased and the coverage gap between rich and poor countries decreased. Creation of Gavi, the Vaccine Alliance, in 2000 allowed the poorest countries in the world to benefit from new, life- saving vaccines and expand the breadth of protection against an increasing number of vaccine- preventable diseases. Despite this progress, inequities in access to and uptake of vaccines persist. Opportunities to realize the full potential of vaccines are within reach but require focused, tailored and committed action by Governments and immunization stakeholders. The Immunization Agenda 2030 provides a framework for action during the next decade to attain a world where everyone, everywhere, at every age fully benefits from vaccines for good health and well-being [5]. The health care delivery system must be dynamic in implementation of immunization programs to the entire country. Some countries in South Africa have had relatively successfully shifts from state-run supply chain management, which is proven to be highly inefficient, to innovative modalities such as private sector outsourcing [6].

An article by the UNICEF (2023) on the immunization of children in the Philippines explains that the Department of Health has identified routine immunization for children as an essential health service to prevent the spread and avoid outbreaks of vaccine-preventable diseases. The provision of routine vaccinations for children below one year old, including supplemental or catch-up vaccination for children, is maintained as long as the COVID-19 response measures will allow [7].

Immunization helps protect every child's right to good health. However, routine immunization coverage among children in the Philippines has not reached the ideal 95% target, with the coverage rate for many vaccines declining from 2010 to 2021. This resulted in measles and polio outbreaks in the country in 2019, placing children at risk of these life-threatening diseases. In addition to these challenges, fear of entering health facilities and disruptions in the healthcare system overall during COVID-19 only exacerbated declining routine immunization rates. Between 2019 and 2021, there were estimated declines in the coverage of DTP1, DTP3, measles, and BCG from roughly 75% to 57%. In 2021, the Philippines was listed as one of 10 countries with the highest number of zero dose children worldwide [8].

In the research study in Santo Tomas, Davao del Norte, BCG and HEPA B vaccines showed significant declines in coverage from 2020 to 2021 but a slight increase in 2022. BCG coverage dropped from 82.5% to 35.4% in 2021 and then increased to 70.7% in 2022. HEPA B followed a similar trend, with a drop from 82.7% to 36.0% in 2021 and an increase to 68.3% in 2022.DPT 1, DPT 2, and DPT 3 showed an increase in coverage over the three years. DPT 1 increased from 78.4% in 2020 to 75.5% in 2022. OPV 1, OPV 2, and OPV 3 all showed increasing coverage rates over the years. OPV 3 had the highest coverage in 2022 at 74.7%. Both IPV 1 and MMR had higher coverage in 2022 compared to 2020, with MMR reaching 75.0% in 2022. PCV 1 and PCV 2 showed increases in coverage from 2020 to 2022, with

PCV 2 reaching 74.8% in 2022. However, PCV 3 had a decrease in coverage from 79.8% in 2020 to 70.7% in 2022. The percentage of the population fully immunized increased from 77.8% in 2020 to 73.7% in 2022, with a dip in coverage in 2021. The slight decline could be attributed to hesitancy of the mothers especially that the time period covers the pandemic and the post-pandemic periods. Nurses from the Rural Health Unit verbalized that the hesitancy is influenced by fake news spreading on social media regarding the nature of the vaccines as advocated by conspiracy theorists. With the looming threat of vaccine hesitancy that may cause more delays in vaccination or even vaccine refusals, the gains achieved against vaccine-preventable diseases are at risk [9]. Immunization should aim for both high immunization coverage levels and timely administration of vaccines – not early, not late [10].

5. Conclusion

The vaccination prevalence in Santo Tomas, Davao del Norte showed that the highest compliance to all vaccination is in the year 2020 while the lowest is in the year 2021. There is significant difference in the prevalence of immunization between males and females among infants aged 0-12 months for the years 2020, 2021, and 2022. This information shows that vaccination compliance is regarded important and beneficial to children in Santo Tomas, Davao del Norte. This study emphasizes the dynamic nature of vaccination coverage, influenced by changes in the eligible population and varying rates of coverage for individual vaccines. The observed decline in fully immunized percentages calls for targeted interventions and strategies to address gaps in immunization coverage.

Recommendations

In the light of the results of the research study, the following recommendations are presented:

- Implement public health campaigns to raise awareness about the importance of childhood vaccination. Provide information about the safety and efficacy of vaccines to dispel myths and concerns that might have contributed to the decline in coverage.
- Invest in and strengthen the local healthcare infrastructure to ensure that vaccines are readily available and accessible to all children. This includes improving the vaccine supply chain, healthcare worker training, and vaccine delivery systems.
- Ensure regular and transparent reporting of vaccination coverage data to the public, healthcare providers, and policymakers. Feedback mechanisms can help identify and address issues promptly.
- Continuously evaluate the effectiveness of vaccination programs and make necessary adjustments to improve coverage.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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References

[1] World Health Organization. (2020). *Global tuberculosis report*. Retrieved November 27, 2023 from https://www.who.int/publications/i/item/9789240013131

[2] Official Gazette of the Republic of the Philippines. (2011). Republic Act No. 10152. Retrieved November 27, 2023 from https://www.officialgazette.gov.ph/2011/06/21/republic-act-no-10152/

[3] Dean R Hess, Retrospective Studies and Chart Reviews, Respiratory Care, October 2004, 49 (10) 1171-1174.

[4] World Health Organization. (2020). *Global tuberculosis report*. Retrieved November 27, 2023 from https://www.who.int/publications/i/item/9789240013131

[5] Lindstrand, A., Cherian, T., Chang-Blanc, D., O'Brien, K. L. (2021). *The world of immunization: achievements, challenge,. and strategic vision for the next decade*. Journal of Infectious Diseases, 224(12) 452-467. https://doi.org/10.1093/infdis/jiab284

[6] Lyndon, P., Raubenheimer, T., Arnot-Kruger, M., & Zaffran, M. (2015). Outsourcing vaccine logistics to the private sector: The evidence and lessons learned from the Western Cape Province in South-Africa. Vaccine, 33(29), 3429-3434. doi:https://doi.org/10.1016/j.vaccine.2015.03.042

[7] United Nations International Children's Emergency Fund. (2021). *Routine immunization for children in the Philippines*. Retrieved November 27, 2023 from https://www.unicef.org/philippines/stories/routine-immunization-children-philippines

[8] World Health Organization and United Nations International Children's Emergency Fund. (2021). *Philippines: WHO and UNICEF estimates of immunization coverage: 2021revision*. Retrieved November 27, 2023, from chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://cdn.who.int/media/docs/default-source/country-profiles/immunization/2022-country-profiles/immunization_phl_2022.pdf

[9] Raguindin, P. F., Morales-Dizon, M., Aldaba, J., Mangulabnan, L. P., Reyes, R. P., Batmunkh, N., Ducucsin, M. J., Lopez, A. L. (2021). Timeliness of childhood vaccinations in the Philippines. Journal of Public Health Policy, 42(1)53-70. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7979588/

[10] Ulep, V. G. (2021). *Examining the Country's Expanded Immunization Program and Primary Health Care for Noncommunicable Diseases*. Retrieved December 8, 2021 from https://www.pids.gov.ph/details/event/examining-the-country-s-expanded-immunization-program-and-primary-health-care-for-noncommunicable-di