

## Knowledge in the development of vaccination (diphtheria pertussis tetanus=DPT) and tetanus toxoids (TT) in Timor-Leste.

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### ABSTRACT

**Introduction:** Diphtheria pertussis tetanus vaccination (DPT) and tetanus toxoid (TT) as an immunization helps all people in the world including Timor-Leste to help raise the immunity of people to fight against invasion of the virus not to attack the human body with the microorganism. Timorese health in the health system to look for a clear model of work in the National Strategic Plan Health Sector (PENSS 2011-2030).

**Objective:** Caracterizes the understanding of the crowd and health professionals about the vaccination of pertussis and tetanus toxoids of Timor-Leste.

**Methods:** This is a qualitative and quantitative descriptive type method, including observations, and data collection or information. The study was conducted between health professionals and the people or mother and father of children, from whom she came to health centers, health center level and hospitals in the municipalities, to accompany their babies and pregnant for vaccination, according to the current vaccination schedule in Timor-Leste.

**Discussion results;** Methods of quantitative applicable vaccination in number (n=185:54%) of the Timorese population and health professionals (n=76:46%) in total (n=261:100%).

**Conclusion:** The presented would contribute and helped to the development of diphtheria pertussis tetanus vaccination (DPT), tetanus toxoids in the administration and implementation management in Timor-Leste refers to the ideal context, especially in the prevention of infectious diseases by the practice of implementation of vaccination in the community of Timor-Leste (Gomes, L. & Tilman CB, 2023).

**Keyword:** Administration of Vaccination, Diphtheria Pertussis Tetanus (DPT) and Tetanus Toxoid (TT).

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## INTRODUCTION

The first vaccine on record was created by Edward Jenner in the 18th century. Jenner was born in May 1749 in England, and devoted about 20 years of his life to smallpox studies. In 1796 he implemented an experiment that authorized the discovery of vaccination in 1798 and published his work "An Inquiry into the etiologies and effects of smallpox vaccine", changing, from there, completely the idea of disease prevention." That is still exists today in the universe and especially in Timor-Leste cited by (Gomes, L. & Tilman CB, 2023). The vaccine is an important form of active immunization (when the body itself produces the antibodies) and is based on the penetration of the disease-causing agent (attenuated or inactivated) of substances that these agents produce in a person's body in order to stimulate the production of antibodies and memory cells by the immune system. Because of the production of antibodies and reminiscence cells, the vaccine ensures that when the causative agent of the disease infects the body of that person, it is already prepared to respond quickly, even before the onset of the disease."

The vaccine is therefore an important form of disease prevention. Timor-Leste occupies the territorial extension of 14,610 km<sup>2</sup> of the insularity of the Island of Timor. Notably has a population of 1,340,434, inhabitants (of which 643,167 men and 626,448 women) the population density of approximately 78 inhabitants per km<sup>2</sup> and population growth of 2.51%, being considered the fastest growth than expected. Diphtheria pertusa tetanus, are examples of diseases that can be prevented currently by vaccination, DPT contains diphtheric toxoid, tetanus toxoid and bordetella pertússis inactivated in suspension, having as adjuvant hydroxide or aluminum phosphate, being presented in liquid form in ampoule, in ampoule bottle with single dose or vial-ampoule with multiple doses 1 (D). The DPT vaccine should be used routinely in childhood, from two months of age, intramuscularly deep, in the vastness of the thigh. In children older than two years of age, it can be applied in the deltoide region.

The recommended basic regimen consists of three doses with an interval of 60 days, minimum of 30 days, with a booster between 6 and 12 months after the third dose, preferably at the 15th month of age 1 (D). A second booster, between four and six years of age, may be recommended, depending on the risk and cost assessment versus benefits of vaccination, and the DPT vaccine was not used from the age of seven years. The vaccine is an important form of active immunization (when the body itself produces the antibodies) and is based on the introduction of the causative agent of the disease (attenuated or inactivated) or substances that these agents produce in a person's body in order to stimulate the production of antibodies and memory cells by the immune system. Because of the production of antibodies and memory cells, the vaccine ensures that when the causative agent of the disease infects the body of that person, they are already prepared to respond quickly, even before the onset of symptoms of the disease. The vaccine is therefore an important form of disease prevention. Immunizations is an infrastructure to maintain the conservation of vaccines and ensure their effectiveness, namely the vaccination of diphtheria pertussis tetanus and tetanus toxoids in Timor-Leste according to the national and international implementation rules cited by (WHO, 2020; Gomes, L. & Tilman CB, 2023).

**General objective:** It is to characterize the knowledge of the population and health professionals about the immunization of pertussal diffrhyphite tetanus and tetanus toxoids in East Timor.

**Specific objective;**

1. It is essential to minimize the number of diseases especially diphtheria pertussis tetanus (DPT) and tetanus toxoids (TT) in Timor-Leste in strengthening vaccination for disease prevention.
2. Clarify the procedures and conducts related to indications and contraindications of immunization with tri-

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ple DPT and TT vaccine of Timor-Leste.

3. Characterizing the knowledge of the population of Timor-Leste in DPT and TT immunization is very important.

### **THEORETICAL ENQUADRATION**

DPT and TT vaccination is an important way to know active immunization well (when the body itself produces the antibody) and is based on the introduction of the causative agent of the disease (attenuated or inactivated) of substances that these agents produce in a person's body and so as to stimulate in the production of antibodies and memory cells by the immune system. Because of the production of antibodies and reminiscence cells, the vaccine ensures that, the causative agent of the infectious disease body of this person, it is already prepared to respond quickly, even before the onset of symptoms of the disease. The DPT and TT vaccine contains diphtheric toxoid, tetanus toxoid and inactivated suspension pertussis bordetella, having as adjuvant hydroxide or aluminum phosphate, being presented in liquid form in ampoule, in a vial with single dose or vial-ampoule with multiple doses. 1. DPT and TT were applied to people in childhood, and pregnant people. The diphtheria pertussis tetanus vaccine should be routinely used in childhood, from two months of age, intramuscularly deep, in the vastest lateralis of the thigh. In children older than two years of age, it can be applied to the deltoid region. Also, tetanus toxoids (TT), in the same way of application for women of child bearing age and pregnant women, in the prevention of infectious and well-protected diseases cited by (Gomes, L. & Tilman CB, 2023).

The recommended basic regimen consists of three doses with an interval of 60 days, minimum of 30 days, with a booster between 6 to 12 months after the third dose, preferably at the 15th month of age 1 year. A second booster, between four and six years of age, may be recommended, depending on the risk assessment and cost versus benefit of vaccination, not using the seven-year-

old DPT vaccine. The vaccine is an important form of active action vaccine (when the body itself produces the antibodies) and is based on the introduction of the causative agent of the disease (attenuated or inactivated) and substances that these agents produce in a person's body so as to stimulate the production of antibodies and memory cells by the immune system. The vaccine difteria pertusa tetanus in pregnancy the Adult Acellular Triple Bacterial Vaccine (dTpa) is indicated to be taken in pregnancy because it stimulates the woman's body to produce antibodies, which then pass to the baby through the placenta. Every pregnant woman should take it from the twentieth week, preferably between the 27th and 32nd weeks, and this should be repeated in all pregnancies that the woman has. Against which diseases the DPT and TT vaccine protects the mother and baby: The incorporation of the DPT and TT vaccine into the national vaccination calendar published in the official communication network that aims to protect newborns against three serious infections:

1. Whooping, which is a very serious disease in babies, especially in those aged up to 3 months of life. It is caused by the bacterium Bordetella Pertussis, which causes an inflammatory picture in the airways and, in extreme situations, can cause death from respiratory failure. Pertussis was a disease that had been reduced every decade, but has reappeared in recent years.
2. Tetanus toxoids can also be very serious in both mothers and babies who have just been born. The causative bacteria produce a toxin that paralyzes the muscles, including those of breathing, leading to death.
3. Diphtheria pertussis tetanus is a bacterial disease that, in extreme cases, can cause edema in the neck, leading to asphyxia, a risk for newborns.

As the baby can only be vaccinated against these diseases at 2 months of life, it is important that the mother ensures its protection by immunizing. In addition to the mother, who most needs to take the vaccine: It is advisa-

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ble that people who will live close to the baby, such as the father, siblings and grandparents, are also vaccinated, because they may have received immunity for a long time and, therefore, are already at risk again.

The side effects of the vaccine DPT: the application of the vaccine in intramuscular and can cause some reactions, such as redness at the application site, pain, tenderness and swelling, which should improve after 24 hours.

Other possible side effects are fever, drowsiness in the first few hours and irritability. Stick to the vaccination schedule for pregnant women and ensure their immunization and future baby. With comfortable facilities and a specialized medical nursing team, the Vaccination Clinic is prepared to clarify your doubts and provide a service of excellence when it comes to vaccination. The clinic is trained in vaccine rooms by the Government Epidemiological Surveillance and constantly updated in periodic courses of the population of Timor-Leste immunizations program. It has an infrastructure to maintain the conservation of vaccines and ensure their effectiveness. The indicators of the immunization expansion program (PEI), are presented in coverage in tables 1 and 2 shows the coverage of various types for immunization of children < 1 year; which shows the immunization coverage of tetanus toxoids (TT) for pregnant women in the progress of health and well-being development.

Timor-Leste, during the year 2021, national vaccination results 105% coverage the immunization of the Municipality of Manufahi reached 95% with high coverage. Municipality of Baucau has a large immunization coverage of 112%, in the period 2021, immunization coverage of diphtheria pertussis tetanus of the results immunization is two years (2020-2021), in the low category is 56% in six municipalities (2020) due to covid 19 and grow in (2021) there are 78%, in the vaccination of DPT of Municipality Covalima Suai immunization the results show that more than 100% in the period referred. With regard to the tetanus

toxoid immunization rate (TT) for pregnant women, the 2020-2021 annual coverage period does not grow much due to covid pandemic 19. Timor-Leste, immunization TT2 + is 38%, coverage between municipalities range from 19% in Lautem is 55% in Baucau Municipality, from the point of view the literature review in terms of vaccination coverage is not better due to the pandemic situation, this is the reality (Gomes, L. & Tilman CB, 2023).

## RESEARCH METODOLOGY

We were responsible for a characterization of a mixed or combined descriptive quantitative and qualitative approach between qualitative and quantitative, in the justification of the work in the field of research performing in Timor-Leste of the vaccination coverage of universal pertusa titano the data were analyzed in the national immunization program applied specifically in the indicated vaccine. With respect in this study, it is characterized as an environment, transversal based on primary data, observational and descriptive type in the application of questionnaires in two population groups and health professionals. Data analysis we will investigate or use simple descriptive statistics to the Computer Program SPSS (*Statistical package for the Social Sciences*) and the results presented in tables.

## RESULTS DAND DISCUSSION

After data collection in various health institutions and different types of information by questionnaires 261 respondents in two study groups it is now possible to perform analysis and subsequent presentation of discussion (in the frequency of the population 60% and health professionals 40%). The sample of the population group is 185 respondents, in the sample characterization of health professionals are 76 people of the study, thus, a total sample of 161 gave a positive indication to interpret in table 1 and 2 appropriately in the research. Table 1. The distribution of the population in the study.

Variable	N (185)	%
Age: 20-25 years	4	2,2%
26-30 years	42	22,7%
31-35 years old	54	29,2%
36-45 years old	85	45,9%
You know the DPT and TT vaccine:		
Don't know	2	1,1%
Less know	9	4,9%
I know the vaccine	90	48,6%
Well-known	84	45,4%
The vaccine is good:		
Lousy	1	0,5%
Mediocre	7	3,8%
Enough	71	38,4%
They're Good	81	45,9%
Very good	21	11,4%
The child is healthy:		
More or less	2	1,1%
A little badly	33	17,8%
It's healthy	133	61,1%
Very healthy	37	20%
Routine vaccine access:		
Not access	2	1,1%
Little access	15	8,1%
Sufficient access	5th 1	27,6%
Very well access	117	63,2%
Vaccine benefit:		
You have no idea	6	3,2%
Little benefit	31	16,8%
Sufficient benefit	40	21,6%
Very good	108	58,4%
Promotion to DPT and TT:		
In the campaign	3	1,6%
Little campaign	28	15,1%
Good promotion	38	20,5%
Very good news	116	62,7%

Age is an important aspect of conditioning the population in this research. Regarding the age of the population group, the age over 45.9% of the respondents was justified, and 2.2% lower according to the research result. Especially in the benefit of the DPT and TT vaccine, it was found in the population group that says it has no idea 3.2% of people, little benefit 16.8% of respondents, sufficient benefit 21.6% of sample and very good 58.4% of respondents, according to the result of the analysis in table 1 of interpretation in the research results (Gomes, L. & Tilman CB, 2023).

Table 2. The sample of health professionals in this research

Variable	N (76)	%
Age: 20-29 years	14	18,4%
30-39 years old	24	31,6%
40-49 years old	36	47,4%
50-60 years	2	2,6%
Education Level:		
Bachelor	42	55,3%
Degree	16	21,1%
Specialization	11	14,5%
Masters	7	9,2%
Experience service:		
1-5 years	15	19,7%
6-10 years	17th	22,4%
11-15 years old	32	42,1%
16-24 years old	12	15,8%

DPTa Science:		
Enough	7	9,2%
Good	25	32,9%
Very good	44	57,9%
Vaccine quality:		
Good	4	5,3%
Very good	46	60,5%
Excellent	25	34,2%
Vaccination plan:		
Enough	6	7,9%
Good	13	17,1%
Very good	57	57,0%
Vaccine priority:		
Enough	1	1,3%
Good	22	28,9%
Very good	53	69,7%

In view of the above, we can infer that they privilege age, the importance of the roles played and the way in which the trust of responsibility of their role in the health institution, according to the age classification of health professionals 20-29 years 18.4%, 30-39 years 31.6%, 40-49 years 47.4% and 50-60 years 2.6% is lower age see in table 2. With regard to education, it is justified that the majority of respondents are bachelor's degrees (55.3% of the sample). Also in the degree 21.1%, in specialization 14.5% in relation to the master's degree, the highest educational level, it is verified that the degree that holds 9.2% in the sample people verifies in the (table 2).

Table 3. Comparison of residences of the 2 groups under study

Municipalities and residence sites	Population N (185) & %	Healthcare professionals N (76) & %
Aileu	20 = 10.8%	7 = 9.2%
Baucau	27 = 14.6%	12 = 15.8%
Dili	33 = 17.8%	17 = 22.4%
Ermera	27 = 14.6%	12 = 15.8%
Manatuto	19 = 10.3%	7 = 9.2%
Same/Manufahi	20 = 10.8%	6 = 7.9%
Lospalos/Lautem	20 = 10.8%	8 = 10.5%
Oecússi/RAEOA	19 = 10.3%	7 = 9.2%
Total: 8 Municipalities	185=100%	76=100%

Regarding the municipalities and places of residences in the population group, it was found that it is higher in the municipality of Dili (17.8% of the respondents) and only two municipalities are equal to 10.3% of Manatuto and Oecússi in the study. While three municipalities equal in the average 10.8% is of Aileu, Manufahi and Lautem see in (table 3). In the group of health professionals, the highest frequency of Municipality Dili Capital of Nation 22.4% and in the lower distribution result of study of three municipalities: Aileu, Manatuto and Oecússi equal is 9.2% of the respondents see in the (table 3). In the assessment of the dimensions of diphtheria pertussis tetanus (DPT) and TT vaccination, it was performed through exploratory analysis, with the objective of reducing the data obtained from sampling 261 questionnaires applied, as explained at the beginning of introduction of DPT and TT in the research methodology. During this investigation, we consider the multidisciplinary and pluralistic view of the relationship between the DPT vaccine and TT with the knowledge of the population and health professionals, in alignment with the appropriate theoretical conceptual position cited by (Prologo and McDermonnt, 2014; Gomes, L. & Tilman CB, 2023).

Table 4. DPT vaccination coverage each municipality of Timor-Leste January-December 2021.

Municipal-ities	DPTa 1 and 2						DPTA 3					
	N			%			N			%		
	M	F	I'm going to	M	F	I'm go in g to	M	F	I'm going to	M	F	I'm go- ing to
Aileu	925	865	One, i'm sorry. 791	38	35	73	646	722	One, i'm sorry. 368	49	54	103
Ainaro	731	648	One, i'm sorry. 379	34	31	65	One, i'm sorry. 498	One, i'm sorry. 314	Two of them. 812	78	68	146
Baucau	1.372	One, i'm sorry. 352	Two of them. 724	34	34	68	One, i'm sorry. 955	784	Three of them. 738	61	56	117
Bobonaro	895	857	One, i'm sorry. 752	30	28	58	One, i'm sorry. 12 <sup>th</sup>	One, i'm sorry. 124	Two of them. 251	42	42	83
Covalima	736	721	One, i'm sorry. 457	27	26	53	One, i'm sorry. 527	One, i'm sorry. 525	Three of them. 051	91	91	182
Dili	4967	Four, four, four. 831	Nine, two. 798	33	32	65	Two of them. 847	Two of them. 602	Five, five of them. 449	39	36	75
Ermera	2.132	One, i'm sorry. 98 <sup>th</sup>	Four, four, four. 115 <sup>th</sup>	39	36	74	Two of them. 2012	Two of them. 028	Four, four, four. 233	58	53	111
Lautem	1.144	816	One, i'm sorry. 960	52	37	88	624	550	One, i'm sorry. 17 <sup>th</sup>	34	30	64
Liquiçá	1.204	One, i'm sorry. 086 <sup>th</sup>	Two of them. 292	37	33	70	One, i'm sorry. 875	One, i'm sorry. 755	Three of them. 630	89	84	173
Manatuto	598	538	One, i'm sorry. 13 <sup>th</sup>	39	35	73	632	559	One, i'm sorry. 191	50	44	94
Manufahi	672	656	One, i'm sorry. 328	35	34	68	575	593	One, i'm sorry. 168	41	42	82
Oecússi	751	859	One, i'm sorry. 610	42	48	90	One, i'm sorry. 079 <sup>th</sup>	994	Two of them. 073	57	53	110
Viqueque	1104	904	Two of them. 008 <sup>th</sup>	38	31	69	One, i'm sorry. 057 <sup>th</sup>	One, i'm sorry. 024	Two of them. 081	53	52	105
<b>East Timor</b>	<b>17.231</b>	<b>16. 11<sup>th</sup></b>	<b>Thirty-three. 347</b>	<b>35</b>	<b>33</b>	<b>68</b>	<b>17. 646</b>	<b>16. 573</b>	<b>Thirty-four. 219</b>	<b>54</b>	<b>51</b>	<b>106</b>

The results were found in (Table 4), vaccination coverage at the national level of diphtheria pertussis tetanus (DPT) of Timor-Leste 2021. When compares vaccination coverage between DPT 1.2 and DPT3, there is a difference and a significant equality of all municipalities with greater and lesser diphtheria pertussis tetanus 1, 2 in the municipality



of Lautem is 88% and Covalima Suai 53% justified in (table 4). While in DPT 3 indicated that the Municipality of Lautem 64% lower, Municipality of Dili 75%, Municipality of Manufahi 82%, Municipality of Bobonaro 83%, Municipality of Manatuto 94% in the middle category. Thus, the municipalities with diphtheria pertussis tetanus (DPT3) coverage and of superior coverage of 100% is: Ermera, Baucau, Aileu, Ainaro, Liquiçá and Oecússi according to the research result. In implementation resolutions, mass vaccination is recommended in the epidemiological realities of diseases, clinical profiles of ensuring vaccine risks and readiness, immunization biology and the characteristics of populations to be vaccinated in each Member State of the World Health Organization cited by (WHO, 2020; Gomes, L. & Tilman CB, 2023).

Table 5. TT Immunization Coverage for pregnant women, by Municipalities of Timor-Leste, January - December 2021.

Municipalities	Target Proj. of pregnant mothers	TT-1		TT-2		TT+2	
		N	%	N	%	N	%
Aileu	One, i'm sorry. 841	473	26	378	21	508	28
Ainaro	Six, six. 050th	493	8	436	7	533	9
Baucau	Three of them. 041	545	18	516	17	One, i'm sorry. 652	54
Bobonaro	Two of them. 521	560	22	480	19	One, i'm sorry. 096th	43
Covalima	Two of them. 036	437	21	398	20	774	38
Dili	11. 372	Three of them. 348	29	Two of them. 778	24	Four, four, four. 914	43
Ermera	Four, four, four. 13th	996	24	875	21	One, i'm sorry. 216	29
Lautem	One, i'm sorry. 715	99	6	121	7	386	23
Liquiçá	Two of them. 430	466	19	429	18	One, i'm sorry. 003	41
Manatuto	One, i'm sorry. 15th	473	41	369	32	384	33
Manufahi	One, i'm sorry. 421	70	5	207	15	322	23
Oecussi	One, i'm sorry. 319	560	42	366	28	475	36
Viqueque	Two of them. 16th	528	24	392	18	599	28
<b>East Timor</b>	<b>Forty-one. 196th</b>	<b>Nine, two. 048</b>	<b>22</b>	<b>Seven, seven. 745</b>	<b>19</b>	<b>Thirty-three. 861</b>	<b>34</b>

We analyzed the results obtained, expressed in (Table 5), the national coverage of tetanus toxoides vaccination (TT) at the national level of Timor-Leste between January-December 2021 it was justified that: Municipality of Ainaro was the lowest place TT1 8%, TT2 7% and TT3 9% according to the research result. Municipality of Lautem TT1 6%, TT2 7% and TT3 23%. Municipality of Manufahi TT1 5% TT2 15% and TT3 23%, while comparison the two municipalities of Lautem and Manufahi TT3 are equal to 23% of the results see in (table five). While the Special Administration Region of Oecússi Ambeno still occupies the place considered high in TT1 42%, but average in TT2 28% and TT3 36% of respondents. Municipality of Manatuto TT1 41%, TT2 32% and TT3 33%. National Result of Timor-Leste TT1 22%, TT2 19% and TT3 34% according to research result. One of the factors necessary for the stability and immune power of vaccines is the cold network system, as it includes processes of storage, conservation, management or handling, distribution and transport of vaccines of the national immunization program, which should have the appropriate refrigeration conditions, from the laboratory where vaccines are produced, to the pro-



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cess in which the vaccine is administered cited by (UNICEF & WHO, 2015; MSTL, 2018; Gomes, L. & Tilman CB, 2023).

Good vaccination practices and contribute to ensuring the quality of immunization, it is important to keep vaccines at the recommended temperature between 2° -8°c, as well as ensure safety in the administration of vaccines. All health professionals of vaccination services should monitor the cold network and know how to conduct if it occurs in any accident in their area of responsibility of the national vaccination program especially the vaccine of the difteria pertusa tetanus and toxoids tandtânicthose cited by (Gomes, L. & Tilman CB, 2023).

## CONCLUSION

Information obtained from the population and health professionals about immunizations is taken for granted. Less coverage in vaccination or discontinuation of immunization in successive years due to the ability to organize health services, with minimal movements of vaccination and health promotion can have serious consequences when the maximum importance in this area. However, with the goodwill and responsibility of health professionals and the support of health managers in the innovation program of health technologies considered an opportunity to improve the quality of health services. Finally, given the nature of the area and the groups involved, another research path can be directed to the analysis of subsystems that coexist in the same health institution and perceive, therefore, different types of behaviors in each group and its role of influence in the situation of potential institution of generation of a dominant culture. It was, connoisseurs of this difficult reality, that we both have so, Timor-Leste has its own nature of important and the National Immunization Program, be better in the long run, gathering the collection of evidence on the drivers of vaccination.

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