STATISTICAL NUMBER OF CHILDREN BEING IMMUNIZED AGAINST MEASLES IN 2023

(A CASE STUDY OF NATIONAL BUREAU OF STATISTICS)

BY

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PRESENTED TO

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CERTIFICATION

This is to certify that this project was carried out by SHITTU BARAKAT ABISOLA, Has been read and approved as meeting the requirements in partial fulfilment of the award of Higher National Diploma (HND) in statistics, institute of applied science, Kwara state polytechnic, Ilorin.

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DEDICATION

This project is dedicated to Almighty God for granting me the ability, wisdom, knowledge and understanding toward the successful completion of my Higher National Diploma (HND) and project, I also dedicate this project to my lovely parent MRS. SHITTU For her prayers, advices, financial support and encouragements.

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ABSTRACT

This study investigates the trend and factors affecting the number of children immunized against measles in Ilorin, Nigeria, using secondary data obtained from the National Bureau of Statistics. The research focuses on three Local Government Areas (LGAs): Ilorin East, Ilorin South, and Ilorin West. The objectives include examining the trend of measles immunization coverage, evaluating the effectiveness of government and health agency efforts, and determining if there are significant differences in immunization levels among the LGAs. A quantitative research design was employed. Descriptive statistics were used to explore central tendencies and variability, while trend analysis helped visualize monthly fluctuations. One-Way ANOVA was employed to test for significant differences in immunization coverage among the LGAs, followed by a Post Hoc (Turkey HSD) test to identify specific group differences. The findings revealed that Ilorin West recorded the highest immunization rates, while Ilorin South showed the lowest and most inconsistent figures. A statistically significant difference ($p < 0.05$) was found among the LGAs. The study concludes that while government and health agency interventions have made progress, disparities remain in immunization coverage across different regions. Recommendations were made to strengthen routine immunization programs, improve equitable distribution of resources, and enhance community sensitization efforts.

Keywords: Measles, Immunization, Children, Ilorin, SPSS, Health Statistics, ANOVA, Public Health

TABLE OF CONTENT

CHAPTER ONE

1.0 INTRODUCTION

In Nigeria, children are vaccinated against measles at the age of 9 months, and this has led to a significant reduction in morbidity and mortality from the infection in the country (1). Despite this, Nigeria still ranks top among Countries with endemic and uninterrupted transmission of measles infection yearly in Sub-Saharan Africa (20). In 2008 alone. 9.960 measles cases were reported in the country, making it the second largest in the period. While 18,843 cases were reported in 2011 (14). Although there was progress in the elimination of measles infection since the initiation of the Expanded Program on Immunization (EPI) in 1989 in Nigeria, several factors have impeded the success of the program. Among these factors, the inability of the country to reach and sustain very high vaccination coverage in all states, thereby leaving a pool of susceptible children, remains foremost (21,22). Others include questions on the potency of the vaccine in the field. its ability to induce lifelong protection, and the need for a second dose schedule apart from supplemental and catch-up vaccination (15). Aside political and financial commitments to the eradication of the infection, the likelihood of children becoming infected before the recommended measles vaccination age of 9 months due to waning maternal antibodies before the age of 6 months is also a challenge. Similarly, the fact that many children who receive measles vaccination still become infected with measles calls for concern. Measles infection is an acute, highly contagious viral infection caused by the measles virus (15). The virus is a spherical, enveloped, single-stranded RNA virus with six identified structural proteins, three protein complexes with viral RNA-namely, nucleoprotein (N), polymerase (P), and the large protein (L) and three proteins in the envelope-hemagglutinin (H), matrix (M), and fusion (F) (15). All of these proteins are antigenic and capable of stimulating an antibody response. Until the introduction of a live-attenuated vaccine in the early 1960s, measles was a worldwide epidemic with more than 130 million cases occurring annually.

The infection was also a leading cause of death, deafness, blindness, and brain damage worldwide among children younger than 5 years old (6). With the advent of potent vaccines, the number of measles cases has reduced globally, with a 78% drop in measles infection between 2000 and 2012 (14). Despite this success, there were an estimated 122,000 deaths from measles in 2012 alone.

1.1 BACKGROUND OF THE STUDY

Despite the fact that vaccinations are one of the most successful and cost-effective public Health interventions to reduce mortality and morbidity, approximately 1.4 million children die from vaccine-preventable diseases globally every year. Improvements in vaccination coverage during recent decades have fed to rapid reduction in rates of vaccine-preventable diseases, but inequalities in vaccination coverage persist. Among those vaccine preventable diseases, measles is one of the most contagious Measles vaccination is often given in two doses of a combination vaccine (Measles, Mumps. Rubella (MMR)) and is considered to be safe and effective. In order to reach community-level immunity and eliminate measles, a vaccination coverage level of 95% with two doses is needed Studies have also shown that the measles-containing vaccine (MCV) not only prevent measles infection but also is associated with a reduced risk of all-cause mortality.

After a long period of stability, large measles outbreaks occurred in several World Health Organization (WHO) regions with more than 140.000 deaths worldwide in 2018. These outbreaks have been attributed to insufficient vaccination rates in some settings or unvaccinated clusters, which occur even in countries with high vaccination rates.

These unvaccinated clusters make measles a persisting public health threat especially in a globalized world with increasing traveling habits. Unvaccinated clusters often consist of individuals with vaccine hesitant attitudes within expanding anti vaccination networks. During the past decade, research has shown that people both in high

and low-income countries have lost confidence in some vaccines and particularly in the measles vaccine. Especially the Wakefield scandal, which falsely associated MMR vaccination with autism contributed to a decreased confidence in the measles vaccination. In order to increase vaccination rates and to target interventions in unvaccinated clusters, there is a need to understand the factors associated to vaccination uptake.

1.2 STATEMENT OF THE PROBLEMS

Despite ongoing efforts by the Nigerian government and international health organizations to eliminate measles through routine immunization programs, the country continues to face challenges in achieving optimal coverage. Measles remains one of the leading causes of preventable childhood deaths in Nigeria, particularly in regions with low vaccination rates. According to recent data from the National Bureau of Statistics, measles immunization coverage in 2023 still falls significantly below the 95% benchmark recommended by the World Health Organization (WHO) to establish herd immunity.

The persistence of low coverage levels raises serious public health concerns, especially given the regional disparities in access to vaccines, high dropout rates between the first and second doses, and socioeconomic and cultural barriers that hinder immunization uptake. Rural communities, children from low-income households, and those with limited access to healthcare services are particularly vulnerable.

Furthermore, the lack of reliable, up-to-date data on immunization coverage and the underutilization of existing statistics in policy formulation have continued to impede effective decision-making and planning. It is therefore imperative to examine the statistical trends and patterns of measles immunization in 2023, identify gaps in coverage, and assess the impact of demographic and regional factors on vaccination rates.

This study aims to bridge this gap by analyzing the statistical number of children immunized against measles in Nigeria using 2023 data from the National Bureau of

Statistics, with the goal of providing evidence-based insights that can inform policy and improve immunization strategies nationwide.

1.3 AIM AND OBJECTIVES

The study aim to analyze the trend and factor affecting the number of Children Immunized against measles in Ilorin, Using data from the National Bureau of statistics.

The research was carried out to determine the rate of children being immunize against measles, while the objectives of the study are as follows:

1. To examine the trend of measles Immunization coverage among children in Ilorin over recent year.
2. To evaluate the effectiveness of government and health agencies efforts in promoting measles vaccination.
3. To determine if there is significant different in children immunize against measles among the 16 local government.

1.4 SCOPE AND LIMITATION

The scope of this study of number of children immunized against measles in 16 local Government in Ilorin Kwara state, Nigeria using the data obtained from the database of NATIONAL BEAREAU OF STATISTICS. For the period of one year (2023). Generally, the data is a secondary data thus it is subject to limitation associated with any secondary data. But the critical analysis of the data enables the result to be valuable.

1.5 LIMITATIONS OF THE STUDY

The analysis was limited to three LGAs within Ilorin due to data availability. The study relied solely on secondary data, which may not capture some underlying factors such as

parental awareness or vaccine hesitancy. Only measles immunization was considered, excluding other childhood vaccines that could provide more comprehensive insight into the state of immunization.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews relevant literature concerning measles immunization among children in Nigeria, particularly focusing on the statistical record from the year 2023. It explores national and regional immunization trends, contributing socioeconomic and cultural factors, systemic challenges, and strategic interventions aimed at increasing vaccine coverage. The review draws on data from the National Bureau of Statistics, World Health Organization (WHO), academic research, and other health monitoring institutions.

2.2 OVERVIEW OF MEASLES IMMUNIZATION IN NIGERIA

Measles remains a significant public health concern in Nigeria, contributing to high childhood morbidity and mortality. Immunization is one of the most effective preventive measures, with the measles vaccine introduced in Nigeria's routine immunization program since 1978. Despite this, the country continues to report suboptimal vaccination coverage. According to national data, Nigeria's measles immunization rate for children aged 12–23 months was about 60% in 2022, and this figure showed little change in 2023 (TheGlobalEconomy, 2023). In 2023, a nationwide measles follow-up campaign targeted children aged 9–59 months, reaching over 15.8 million children and achieving an administrative coverage of 104.2% (PMCID: PMC11359599). While this coverage exceeded expectations on paper, disparities in access remained evident, especially in underserved rural and conflict-prone regions.

2.3 REGIONAL DISPARITIES IN IMMUNIZATION COVERAGE

There is a marked regional variation in immunization rates across Nigeria's six geopolitical zones. Studies revealed that the Northern regions—particularly the North East and North

West—lag significantly behind in both the first and second doses of the measles vaccine (MCV1 and MCV2). Between 2021 and 2023, MCV2 coverage ranged from 38% to 46% in the Northern zones, compared to 23% to 37% in Southern regions (PMCID: PMC11550942). A 2021 study in Ogun State, Southwest Nigeria, found that MCV2 coverage was just 39%, with a dropout rate of 35% between MCV1 and MCV2 (Babcock University Medical Journal, 2022). These figures indicate a lack of completion of the full immunization schedule, which weakens herd immunity.

2.4 SOCIOECONOMIC AND CULTURAL DETERMINANTS

Multiple studies have identified strong correlations between socioeconomic variables and immunization uptake. Factors positively associated with complete measles immunization include:

- Maternal education: Educated mothers are more likely to complete their child's immunization schedule.
- Household income: Wealthier families often have better access to healthcare services.
- Urban residence: Urban areas typically have more functional health systems and easier access to clinics.

Conversely, children from rural households, those born into large families, and those whose mothers lack formal education are at higher risk of being unvaccinated (SpringerOpen, 2024). Religious beliefs and cultural practices also influence vaccination uptake. Studies show that children from Christian families are more likely to be vaccinated than those from Muslim families due to differing attitudes toward healthcare services (PMCID: PMC10724030).

2.5 HEALTH SYSTEM CHALLENGES

Health infrastructure in Nigeria suffers from several operational challenges that impact the effectiveness of immunization delivery. These include:

- ✓ Inadequate cold chain and logistics systems.
- ✓ Uneven distribution of healthcare facilities, especially in rural and hard-to-reach areas.
- ✓ Shortage of trained immunization personnel.
- ✓ Irregular training and poor supervision of health workers.

These system-level issues reduce the efficiency of vaccination campaigns and negatively affect the coverage and timeliness of measles immunization (PMCID: PMC10724030).

2.6 STRATEGIC INTERVENTIONS AND INNOVATIONS

To combat the gaps in measles immunization, Nigeria implemented several strategic initiatives. One such approach is the National Strategy for Immunization and Primary Health Care System Strengthening (NSIPSS). This strategy emphasizes:

- Reaching "zero-dose" children, especially in underserved regions.
- Improving coordination between federal and state governments.
- Investing in immunization infrastructure.

From March 2021 to January 2023, over 6 million children benefited from enhanced outreach efforts under NSIPSS (WHO, 2023). Innovative geospatial mapping technologies have also been deployed to identify immunization gaps at the ward level. These tools help pinpoint underserved communities and guide resource allocation (WorldPop, 2023).

2.7 SUMMARY OF LITERATURE REVIEWED

From the reviewed literature, it is evident that Nigeria's measles immunization coverage is improving but still below the WHO-recommended 95% threshold required for herd immunity. Challenges such as regional disparities, socioeconomic inequalities, cultural barriers, and systemic weaknesses continue to hinder national immunization goals. However, targeted campaigns, policy reforms, and strategic health interventions have shown promise in addressing these issues.

CHAPTER THREE

3.0 METHODOLOGY

3.1 RESEARCH DESIGN

This study employed a quantitative descriptive and inferential research design to examine the trend and the factors affecting the number of children immunized against measles in Ilorin. The quantitative approach was chosen because it allows for the analysis of numerical data and helps in identifying patterns, relationships, and differences within the data. Descriptive methods were used to summarize and visualize the data, while inferential statistics were applied to test for significant differences among local government areas.

3.2 STUDY AREA

The study focused on Ilorin, the capital city of Kwara State, Nigeria. Ilorin comprises three major local government areas: Ilorin East, Ilorin South, and Ilorin West. These areas were selected due to their urban population density and availability of detailed immunization data.

3.3 POPULATION AND SAMPLING

The target population for this study includes all children within the immunization age range (typically under five years) residing in Ilorin. However, the study made use of secondary data representing the number of children immunized against measles as officially recorded by the National Bureau of Statistics (NBS). A purposive sampling technique was adopted to select data specific to Ilorin East, Ilorin South, and Ilorin West for the analysis.

3.4 SOURCE OF DATA

This study utilized secondary data obtained from the National Bureau of Statistics. The data included:

- Monthly records of measles immunization figures in Ilorin for a 12-month period.
- Disaggregated data by local government areas (Ilorin East, South, and West).
- Information on government health efforts and national immunization campaigns relevant to the study.
- The data served as a reliable source for analyzing immunization trends and comparing performance across LGAs.

3.5 METHOD OF DATA ANALYSIS

The following analytical methods will be applied:

3.5.1 DESCRIPTIVE STATISTICS

Descriptive statistical tools such as mean, standard deviation, minimum, and maximum will be used to summarize immunization data for each LGA. These helped provide insight into the general performance and variation in measles immunization coverage.

3.5.2 TREND ANALYSIS

A line chart will be generated to visualize the monthly immunization trend for each of the three LGAs. This trend analysis helped identify patterns such as peak periods (likely during national immunization campaigns) and months of low coverage.

3.5.3 MONTHLY COMPARATIVE ANALYSIS

The study used the Means procedure in SPSS to compare the average number of children immunized per month across the LGAs. This will be done to evaluate the effectiveness of government and health agency efforts in different months of the year.

3.5.4 ONE WAY ANALYSIS OF VARIANCE (ANOVA)

A one-way Analysis of Variance (ANOVA) will be used to determine if there were statistically significant differences in measles immunization coverage among the LGAs.

Mathematical Expression of one way analysis of variance and its model.

Model specification

Let:

- $\boldsymbol{Y_{ij}}$: response (dependent) variable
- μ: overall mean
- α_i: effect i-th of group(treatment).
- $\in_{ij}$: random error term (assumed normally distributed with mean 0 and constant variance)

$$\boldsymbol{Y_{ij} = \mu + \alpha_i + \in_{ij}}$$

Where:

- i = 1,2,……., a (number of groups)
- j = 1,2,……., a (number of observation in group i)

TEST HYPOTHESIS

$\boldsymbol{H_0}$:$\alpha_1 = \alpha_2 = \ldots\ldots = \alpha_0 = 0$

$\boldsymbol{H_1}$: At least one group mean is different

Level of significance: α (0.05)

ANOVA TABLE

Source of Variation	**Degrees of Freedom (df)**	**Sum of Squares (SS)**	**Mean of Squares (MS)**	**F-ratio**
Regression	df_R= k-1	SS_R	$MS_R = \frac{SS_R}{df_R}$	$F_A = \frac{MS_R}{MS_E}$
Error	df_E= N-k	SS_E	$MS_E = \frac{SS_R}{df_E}$	
Total	df_t= N-1	SS_t		

Sum of Square:

- SS_R =Sum of square between groups
  - $= \sum nj(\widehat{X_J} - \widehat{X})$

- SS_{error} = Sum of error
  - $= \sum\sum(X - Xj)^2$

- SS_{total} =Sum of total
  - = SSR+SSE

Mean of Square:

- MS_R = Mean square Regression

- MS_E =Mean square Error

ANOVA (F-test): ANOVA (F-test): $F = \frac{MS_R}{MS_{error}} \sim F(df_R, df_E)$

Decision rule: reject the H_0 if the p-value < α (0.05) or accept the H_0 if otherwise.

b. Where significant differences were found, a Turkey Post Hoc test will be carried out to identify the specific LGAs that differed.

THE TURKEY TEST

Suppose that, the following analysis of variance in which we have reject null hypothesis of equal treatment mean, we wish to test all the pair wise means comparisons:

H_0: $\mu_i = \mu_j$

H_0: $\mu_i \neq \mu_j$

For all i ≠ j, Turkey (1953) procedure make use of the distribution of the student range statistic

$$q = \frac{\bar{y}_{max} - \bar{y}_{min}}{\sqrt{\frac{MSE}{n}}}$$

Where $\bar{y}_{max}$ and $\bar{y}_{min}$ are the largest and smallest means respectively, out of a group of p sample means. Contain value $q_\alpha(p, f)$ the upper α is the percentage point of q where f is the number of degree of freedom associate with MSE. For equal sample size. Turkey test declare two means is significant different if absolute value of their sample difference exceed.

$T_\alpha = q_\alpha(p, f)\sqrt{\frac{MSE}{n}}$

CHAPTER FOUR

4.0 DATA PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

This chapter presents the results obtained from the analysis of data on children immunized. The primary objective of the analysis was to explore the patterns in children immunization rates across different Local Government Areas (LGAs) and over different months. The chapter begins with a description of the data processing and overall descriptive statistics, followed by an examination of temporal trends, spatial variations (difthsference between LGAs), and concludes with a post-hoc analysis to identify specific LGAs with statistically significant differences in immunization rates.

4.2 DATA PRESENTATION BY LOCAL GOVERNMENT AREA (LGA)

The table below shows the number of children immunized against measles per month in three LGAs of Ilorin.

Table 4.1: Monthly Immunization Coverage by LGA

LGA/MONTHS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
ASA	1113	1561	413	2525	595	1340	1401	398	2505	437	1519	1800
BARUTEN	2062	533	1198	2134	1633	1528	639	923	2365	1430	2410	1051
EDU	5375	877	468	1242	1329	4552	780	404	1010	1101	4811	1212
EKITI	994	3146	1289	1849	3134	820	1589	1270	192	2417	1068	2580
IFELODUN	377	2535	593	1638	2129	298	2327	615	1470	1432	448	3061

ILORIN EAST	1075	2230	1626	2685	779	1009	2011	1121	2056	810	1364	2466
ILORIN SOUTH	471	994	1136	4063	1000	407	1025	1132	4210	921	549	1706
ILORIN WEST	1224	1800	2604	1117	2162	1120	1873	2425	940	2534	1259	2080
IREPODUN	722	1332	1508	514	3040	498	1377	1716	320	2186	667	1632
ISIN	1517	1961	567	1255	2649	1349	2302	606	1963	963	1624	2915
KAIAMA	1105	5086	839	550	1280	1201	3659	987	431	1292	1176	5381
MORO	2787	967	3146	1479	2130	2369	906	1903	1169	1764	2891	1237
OFFA	2456	233	312	456	3132	2718	900	1008	1322	1234	986	127
OKE ERO	322	554	413	632	654	2090	2981	1098	1009	400	565	134
OYUN	167	234	543	563	245	124	309	2091	341	675	332	246
PATIGI	432	1116	339	541	768	980	2431	1245	709	605	304	322

Source: National Bureau of Statistics (NBS)

4.3 DESCRIPTIVE STATISTICS

Table 4.2: Descriptive Statistics for Each LGA

Descriptives

Children_Immunized

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Asa	12	1300.58	751.221	216.859	823.28	1777.89	398	2525
Baruten	12	1492.17	647.997	187.061	1080.45	1903.88	533	2410

Edu	12	1930.08	1829.660	528.177	767.57	3092.59	404	5375
Ekiti	12	1695.67	942.444	272.060	1096.87	2294.47	192	3146
Ifelodun	12	1410.25	950.308	274.330	806.45	2014.05	298	3061
Ilorin_East	12	1602.67	668.085	192.860	1178.19	2027.15	779	2685
Ilorin_south	12	1467.83	1294.597	373.718	645.29	2290.38	407	4210
Ilorin_west	12	1761.50	607.957	175.502	1375.22	2147.78	940	2604
Irepodun	12	1292.67	803.494	231.949	782.15	1803.18	320	3040
Isin	12	1639.25	751.751	217.012	1161.61	2116.89	567	2915
Kaiama	12	1915.58	1750.266	505.258	803.52	3027.65	431	5381
Moro	12	1895.67	775.898	223.983	1402.68	2388.65	906	3146
Offa	12	1240.33	1009.598	291.446	598.87	1881.80	127	3132
Oke_ero	12	904.33	829.557	239.472	377.26	1431.41	134	2981
Oyun	12	489.17	531.624	153.467	151.39	826.94	124	2091
Patigi	12	816.00	597.284	172.421	436.50	1195.50	304	2431
Total	192	1428.36	1036.227	74.783	1280.85	1575.87	124	5381

The overall descriptive statistics for the variable "Children Immunized" across all included cases are presented below. Table 4.2: Overall Descriptive Statistics for Children Immunized.

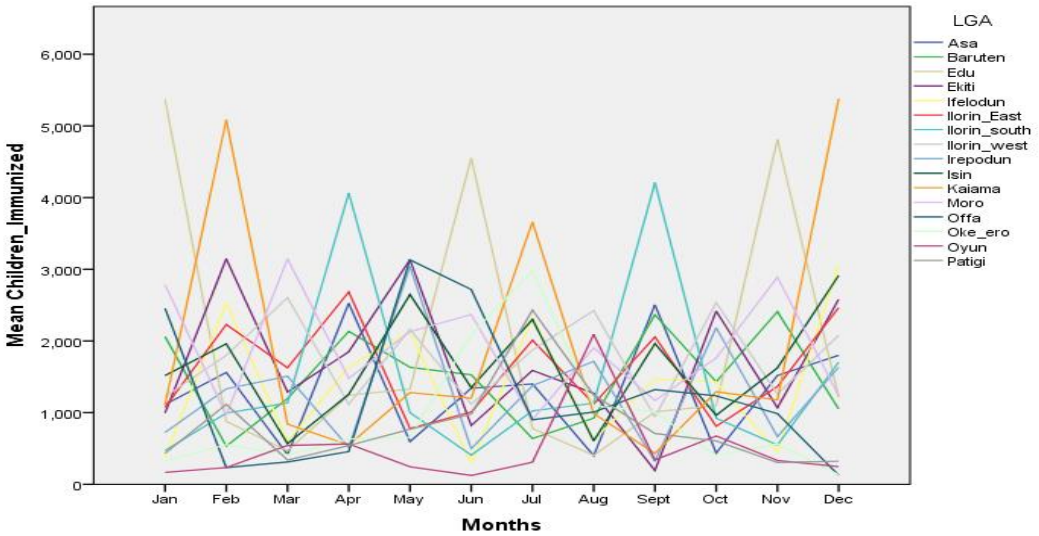
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Children_Immunized	192	124	5381	1428.36	1036.227
Valid N (listwise)	192				

Interpretation: Table 4.2 indicates that the analysis was conducted on 192 valid observations. The number of children immunized in the dataset ranged from a minimum of 124 to a maximum of 5381. The overall average number of children immunized was approximately 1428.36, with a relatively large standard deviation of 1036.227, suggesting considerable variability in the immunization numbers across all observations.

4.4 TREND ANALYSIS

A line chart was generated in SPSS to visualize monthly trends.



Observations:

- ✓ Immunization peaks in February, May and July, likely due to national immunization campaigns.
- ✓ All three LGAs experienced a drop in March and August.
- ✓ Ilorin South shows a sharp spike in April (4,063) and September (4,210), suggesting campaign efforts.

4.5 MONTHLY AVERAGE COMPARISON

The dataset comprised information related to children immunized. Before conducting the main analyses, the data underwent a case processing summary to ascertain the number of included and excluded observations.

Table 4.3: Monthly Mean of Children Immunized Across LGAs

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Children_Immunized * Months	192	98.5%	3	1.5%	195	100.0%

Analysis Output:

Table 4.5 shows that out of a total of 195 potential cases, 192 (98.5%) were included in the analysis, while 3 cases (1.5%) were excluded, likely due to missing values. The subsequent analyses are based on the 192 included valid cases.

ANALYSIS OF TEMPORAL TRENDS

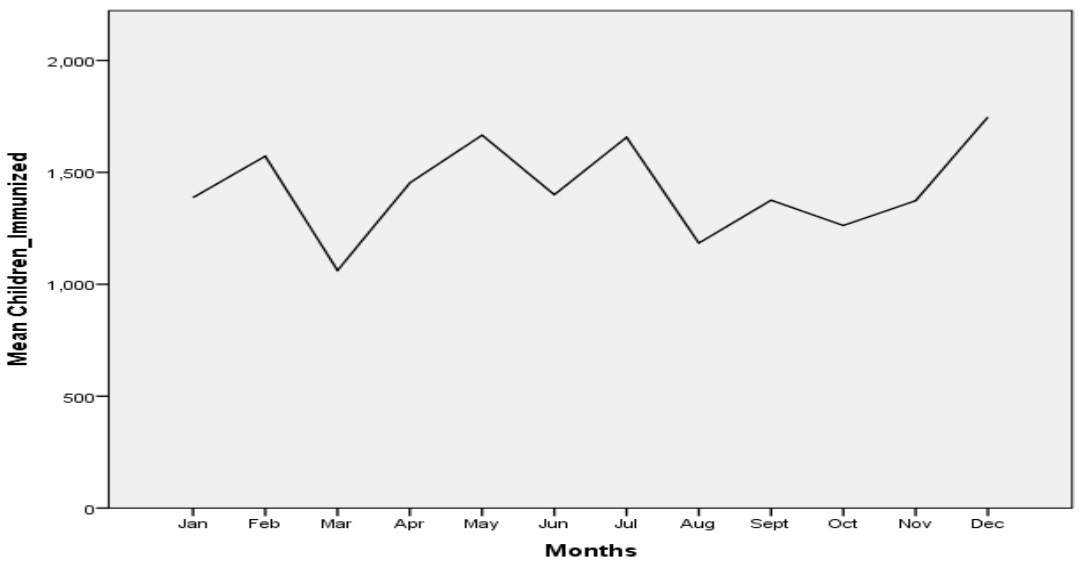
To understand how the number of children immunized varies throughout the year, a descriptive analysis was conducted for each month.

Table 4.3: Monthly Descriptive Statistics for Children Immunized.

Report

Children_Immunized

Months	Mean	N	Std. Deviation
Jan	1387.44	16	1310.176
Oct	1262.56	16	670.939
Nov	1373.31	16	1168.785
Dec	1746.88	16	1370.566
Feb	1572.44	16	1252.653
Mar	1062.13	16	831.780
Apr	1452.69	16	1010.618
May	1666.19	16	977.235
Jun	1400.19	16	1111.629
Jul	1656.88	16	920.310
Aug	1183.88	16	589.341
Sept	1375.75	16	1049.786
Total	1428.36	192	1036.227



Interpretation:

- The highest average was recorded in December, confirming seasonal intervention by health agencies.
- The lowest average occurred in March, possibly due to logistic or weather constraints.

4.6 INFERENTIAL STATISTICS – ONE-WAY ANOVA TEST:

A One-Way ANOVA was conducted to determine if there are statistically significant differences in the number of children immunized across the three LGAs.

Hypotheses:

H_0: There is no significant difference among LGAs.

H_1: At least one LGA differs significantly.

Level of significance

$\alpha = 0.05$

Table 4.4: ANOVA Summary

ANOVA

Children_Immunized

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	30870056.953	15	2058003.797	2.079	.013
Within Groups	174219203.250	176	989881.837		

Total	205089260.203	191			

Interpretation:

- The p-value (Sig.) is 0.013, α which is 0.05.
- Therefore, we reject the null hypothesis, indicating a significant difference in immunization coverage among the LGAs.

4.7 POST HOC TEST (TUKEY HSD)

Multiple Comparisons

Dependent Variable: Children_Immunized

Tukey HSD

(I) LGA	(J) LGA	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Asa	Baruten	-191.583	406.178	1.000	-1603.63	1220.46
	Edu	-629.500	406.178	.975	-2041.54	782.54
	Ekiti	-395.083	406.178	1.000	-1807.13	1016.96
	Ifelodun	-109.667	406.178	1.000	-1521.71	1302.38
	Ilorin_East	-302.083	406.178	1.000	-1714.13	1109.96
	Ilorin_south	-167.250	406.178	1.000	-1579.29	1244.79
	Ilorin_west	-460.917	406.178	.999	-1872.96	951.13
	Irepodun	7.917	406.178	1.000	-1404.13	1419.96
	Isin	-338.667	406.178	1.000	-1750.71	1073.38
	Kaiama	-615.000	406.178	.980	-2027.04	797.04
	Moro	-595.083	406.178	.985	-2007.13	816.96
	Offa	60.250	406.178	1.000	-1351.79	1472.29
	Oke_ero	396.250	406.178	1.000	-1015.79	1808.29
	Oyun	811.417	406.178	.823	-600.63	2223.46
	Patigi	484.583	406.178	.998	-927.46	1896.63
Baruten	Asa	191.583	406.178	1.000	-1220.46	1603.63
	Edu	-437.917	406.178	.999	-1849.96	974.13

	Ekiti	-203.500	406.178	1.000	-1615.54	1208.54
	Ifelodun	81.917	406.178	1.000	-1330.13	1493.96
	Ilorin_East	-110.500	406.178	1.000	-1522.54	1301.54
	Ilorin_south	24.333	406.178	1.000	-1387.71	1436.38
	Ilorin_west	-269.333	406.178	1.000	-1681.38	1142.71
	Irepodun	199.500	406.178	1.000	-1212.54	1611.54
	Isin	-147.083	406.178	1.000	-1559.13	1264.96
	Kaiama	-423.417	406.178	1.000	-1835.46	988.63
	Moro	-403.500	406.178	1.000	-1815.54	1008.54
	Offa	251.833	406.178	1.000	-1160.21	1663.88
	Oke_ero	587.833	406.178	.987	-824.21	1999.88
	Oyun	1003.000	406.178	.499	-409.04	2415.04
	Patigi	676.167	406.178	.953	-735.88	2088.21
	Asa	629.500	406.178	.975	-782.54	2041.54
	Baruten	437.917	406.178	.999	-974.13	1849.96
	Ekiti	234.417	406.178	1.000	-1177.63	1646.46
	Ifelodun	519.833	406.178	.996	-892.21	1931.88
	Ilorin_East	327.417	406.178	1.000	-1084.63	1739.46
	Ilorin_south	462.250	406.178	.999	-949.79	1874.29
Edu	Ilorin_west	168.583	406.178	1.000	-1243.46	1580.63
	Irepodun	637.417	406.178	.972	-774.63	2049.46
	Isin	290.833	406.178	1.000	-1121.21	1702.88
	Kaiama	14.500	406.178	1.000	-1397.54	1426.54
	Moro	34.417	406.178	1.000	-1377.63	1446.46
	Offa	689.750	406.178	.945	-722.29	2101.79
	Oke_ero	1025.750	406.178	.458	-386.29	2437.79
	Oyun	1440.917*	406.178	.040	28.87	2852.96
	Patigi	1114.083	406.178	.313	-297.96	2526.13
	Asa	395.083	406.178	1.000	-1016.96	1807.13
	Baruten	203.500	406.178	1.000	-1208.54	1615.54
	Edu	-234.417	406.178	1.000	-1646.46	1177.63
	Ifelodun	285.417	406.178	1.000	-1126.63	1697.46
	Ilorin_East	93.000	406.178	1.000	-1319.04	1505.04
Ekiti	Ilorin_south	227.833	406.178	1.000	-1184.21	1639.88
	Ilorin_west	-65.833	406.178	1.000	-1477.88	1346.21
	Irepodun	403.000	406.178	1.000	-1009.04	1815.04
	Isin	56.417	406.178	1.000	-1355.63	1468.46

	Kaiama	-219.917	406.178	1.000	-1631.96	1192.13
	Moro	-200.000	406.178	1.000	-1612.04	1212.04
	Offa	455.333	406.178	.999	-956.71	1867.38
	Oke_ero	791.333	406.178	.849	-620.71	2203.38
	Oyun	1206.500	406.178	.193	-205.54	2618.54
	Patigi	879.667	406.178	.719	-532.38	2291.71
	Asa	109.667	406.178	1.000	-1302.38	1521.71
	Baruten	-81.917	406.178	1.000	-1493.96	1330.13
	Edu	-519.833	406.178	.996	-1931.88	892.21
	Ekiti	-285.417	406.178	1.000	-1697.46	1126.63
	Ilorin_East	-192.417	406.178	1.000	-1604.46	1219.63
	Ilorin_south	-57.583	406.178	1.000	-1469.63	1354.46
Ifelodun	Ilorin_west	-351.250	406.178	1.000	-1763.29	1060.79
	Irepodun	117.583	406.178	1.000	-1294.46	1529.63
	Isin	-229.000	406.178	1.000	-1641.04	1183.04
	Kaiama	-505.333	406.178	.997	-1917.38	906.71
	Moro	-485.417	406.178	.998	-1897.46	926.63
	Offa	169.917	406.178	1.000	-1242.13	1581.96
	Oke_ero	505.917	406.178	.997	-906.13	1917.96
	Oyun	921.083	406.178	.648	-490.96	2333.13
	Patigi	594.250	406.178	.985	-817.79	2006.29
	Asa	302.083	406.178	1.000	-1109.96	1714.13
	Baruten	110.500	406.178	1.000	-1301.54	1522.54
	Edu	-327.417	406.178	1.000	-1739.46	1084.63
	Ekiti	-93.000	406.178	1.000	-1505.04	1319.04
	Ifelodun	192.417	406.178	1.000	-1219.63	1604.46
	Ilorin_south	134.833	406.178	1.000	-1277.21	1546.88
Ilorin_East	Ilorin_west	-158.833	406.178	1.000	-1570.88	1253.21
	Irepodun	310.000	406.178	1.000	-1102.04	1722.04
	Isin	-36.583	406.178	1.000	-1448.63	1375.46
	Kaiama	-312.917	406.178	1.000	-1724.96	1099.13
	Moro	-293.000	406.178	1.000	-1705.04	1119.04
	Offa	362.333	406.178	1.000	-1049.71	1774.38
	Oke_ero	698.333	406.178	.939	-713.71	2110.38
	Oyun	1113.500	406.178	.314	-298.54	2525.54
	Patigi	786.667	406.178	.855	-625.38	2198.71
Ilorin_south	Asa	167.250	406.178	1.000	-1244.79	1579.29
	Baruten	-24.333	406.178	1.000	-1436.38	1387.71

	Edu	-462.250	406.178	.999	-1874.29	949.79
	Ekiti	-227.833	406.178	1.000	-1639.88	1184.21
	Ifelodun	57.583	406.178	1.000	-1354.46	1469.63
	Ilorin_East	-134.833	406.178	1.000	-1546.88	1277.21
	Ilorin_west	-293.667	406.178	1.000	-1705.71	1118.38
	Irepodun	175.167	406.178	1.000	-1236.88	1587.21
	Isin	-171.417	406.178	1.000	-1583.46	1240.63
	Kaiama	-447.750	406.178	.999	-1859.79	964.29
	Moro	-427.833	406.178	1.000	-1839.88	984.21
	Offa	227.500	406.178	1.000	-1184.54	1639.54
	Oke_ero	563.500	406.178	.991	-848.54	1975.54
	Oyun	978.667	406.178	.543	-433.38	2390.71
	Patigi	651.833	406.178	.966	-760.21	2063.88
	Asa	460.917	406.178	.999	-951.13	1872.96
	Baruten	269.333	406.178	1.000	-1142.71	1681.38
	Edu	-168.583	406.178	1.000	-1580.63	1243.46
	Ekiti	65.833	406.178	1.000	-1346.21	1477.88
	Ifelodun	351.250	406.178	1.000	-1060.79	1763.29
	Ilorin_East	158.833	406.178	1.000	-1253.21	1570.88
Ilorin_west	Ilorin_south	293.667	406.178	1.000	-1118.38	1705.71
	Irepodun	468.833	406.178	.999	-943.21	1880.88
	Isin	122.250	406.178	1.000	-1289.79	1534.29
	Kaiama	-154.083	406.178	1.000	-1566.13	1257.96
	Moro	-134.167	406.178	1.000	-1546.21	1277.88
	Offa	521.167	406.178	.996	-890.88	1933.21
	Oke_ero	857.167	406.178	.756	-554.88	2269.21
	Oyun	1272.333	406.178	.130	-139.71	2684.38
	Patigi	945.500	406.178	.604	-466.54	2357.54
	Asa	-7.917	406.178	1.000	-1419.96	1404.13
	Baruten	-199.500	406.178	1.000	-1611.54	1212.54
	Edu	-637.417	406.178	.972	-2049.46	774.63
	Ekiti	-403.000	406.178	1.000	-1815.04	1009.04
	Ifelodun	-117.583	406.178	1.000	-1529.63	1294.46
Irepodun	Ilorin_East	-310.000	406.178	1.000	-1722.04	1102.04
	Ilorin_south	-175.167	406.178	1.000	-1587.21	1236.88
	Ilorin_west	-468.833	406.178	.999	-1880.88	943.21
	Isin	-346.583	406.178	1.000	-1758.63	1065.46
	Kaiama	-622.917	406.178	.977	-2034.96	789.13

	Moro	-603.000	406.178	.983	-2015.04	809.04
	Offa	52.333	406.178	1.000	-1359.71	1464.38
	Oke_ero	388.333	406.178	1.000	-1023.71	1800.38
	Oyun	803.500	406.178	.834	-608.54	2215.54
	Patigi	476.667	406.178	.999	-935.38	1888.71
	Asa	338.667	406.178	1.000	-1073.38	1750.71
	Baruten	147.083	406.178	1.000	-1264.96	1559.13
	Edu	-290.833	406.178	1.000	-1702.88	1121.21
	Ekiti	-56.417	406.178	1.000	-1468.46	1355.63
	Ifelodun	229.000	406.178	1.000	-1183.04	1641.04
	Ilorin_East	36.583	406.178	1.000	-1375.46	1448.63
	Ilorin_south	171.417	406.178	1.000	-1240.63	1583.46
Isin	Ilorin_west	-122.250	406.178	1.000	-1534.29	1289.79
	Irepodun	346.583	406.178	1.000	-1065.46	1758.63
	Kaiama	-276.333	406.178	1.000	-1688.38	1135.71
	Moro	-256.417	406.178	1.000	-1668.46	1155.63
	Offa	398.917	406.178	1.000	-1013.13	1810.96
	Oke_ero	734.917	406.178	.910	-677.13	2146.96
	Oyun	1150.083	406.178	.262	-261.96	2562.13
	Patigi	823.250	406.178	.807	-588.79	2235.29
	Asa	615.000	406.178	.980	-797.04	2027.04
	Baruten	423.417	406.178	1.000	-988.63	1835.46
	Edu	-14.500	406.178	1.000	-1426.54	1397.54
	Ekiti	219.917	406.178	1.000	-1192.13	1631.96
	Ifelodun	505.333	406.178	.997	-906.71	1917.38
	Ilorin_East	312.917	406.178	1.000	-1099.13	1724.96
	Ilorin_south	447.750	406.178	.999	-964.29	1859.79
Kaiama	Ilorin_west	154.083	406.178	1.000	-1257.96	1566.13
	Irepodun	622.917	406.178	.977	-789.13	2034.96
	Isin	276.333	406.178	1.000	-1135.71	1688.38
	Moro	19.917	406.178	1.000	-1392.13	1431.96
	Offa	675.250	406.178	.954	-736.79	2087.29
	Oke_ero	1011.250	406.178	.484	-400.79	2423.29
	Oyun	1426.417*	406.178	.045	14.37	2838.46
	Patigi	1099.583	406.178	.335	-312.46	2511.63
	Asa	595.083	406.178	.985	-816.96	2007.13
Moro	Baruten	403.500	406.178	1.000	-1008.54	1815.54
	Edu	-34.417	406.178	1.000	-1446.46	1377.63

	Ekiti	200.000	406.178	1.000	-1212.04	1612.04
	Ifelodun	485.417	406.178	.998	-926.63	1897.46
	Ilorin_East	293.000	406.178	1.000	-1119.04	1705.04
	Ilorin_south	427.833	406.178	1.000	-984.21	1839.88
	Ilorin_west	134.167	406.178	1.000	-1277.88	1546.21
	Irepodun	603.000	406.178	.983	-809.04	2015.04
	Isin	256.417	406.178	1.000	-1155.63	1668.46
	Kaiama	-19.917	406.178	1.000	-1431.96	1392.13
	Offa	655.333	406.178	.964	-756.71	2067.38
	Oke_ero	991.333	406.178	.520	-420.71	2403.38
	Oyun	1406.500	406.178	.052	-5.54	2818.54
	Patigi	1079.667	406.178	.366	-332.38	2491.71
	Asa	-60.250	406.178	1.000	-1472.29	1351.79
	Baruten	-251.833	406.178	1.000	-1663.88	1160.21
	Edu	-689.750	406.178	.945	-2101.79	722.29
	Ekiti	-455.333	406.178	.999	-1867.38	956.71
	Ifelodun	-169.917	406.178	1.000	-1581.96	1242.13
	Ilorin_East	-362.333	406.178	1.000	-1774.38	1049.71
Offa	Ilorin_south	-227.500	406.178	1.000	-1639.54	1184.54
	Ilorin_west	-521.167	406.178	.996	-1933.21	890.88
	Irepodun	-52.333	406.178	1.000	-1464.38	1359.71
	Isin	-398.917	406.178	1.000	-1810.96	1013.13
	Kaiama	-675.250	406.178	.954	-2087.29	736.79
	Moro	-655.333	406.178	.964	-2067.38	756.71
	Oke_ero	336.000	406.178	1.000	-1076.04	1748.04
	Oyun	751.167	406.178	.894	-660.88	2163.21
	Patigi	424.333	406.178	1.000	-987.71	1836.38
	Asa	-396.250	406.178	1.000	-1808.29	1015.79
	Baruten	-587.833	406.178	.987	-1999.88	824.21
	Edu	-1025.750	406.178	.458	-2437.79	386.29
	Ekiti	-791.333	406.178	.849	-2203.38	620.71
	Ifelodun	-505.917	406.178	.997	-1917.96	906.13
Oke_ero	Ilorin_East	-698.333	406.178	.939	-2110.38	713.71
	Ilorin_south	-563.500	406.178	.991	-1975.54	848.54
	Ilorin_west	-857.167	406.178	.756	-2269.21	554.88
	Irepodun	-388.333	406.178	1.000	-1800.38	1023.71
	Isin	-734.917	406.178	.910	-2146.96	677.13

	Kaiama	-1011.250	406.178	.484	-2423.29	400.79
	Moro	-991.333	406.178	.520	-2403.38	420.71
	Offa	-336.000	406.178	1.000	-1748.04	1076.04
	Oyun	415.167	406.178	1.000	-996.88	1827.21
	Patigi	88.333	406.178	1.000	-1323.71	1500.38
	Asa	-811.417	406.178	.823	-2223.46	600.63
	Baruten	-1003.000	406.178	.499	-2415.04	409.04
	Edu	-1440.917*	406.178	.040	-2852.96	-28.87
	Ekiti	-1206.500	406.178	.193	-2618.54	205.54
	Ifelodun	-921.083	406.178	.648	-2333.13	490.96
	Ilorin_East	-1113.500	406.178	.314	-2525.54	298.54
	Ilorin_south	-978.667	406.178	.543	-2390.71	433.38
Oyun	Ilorin_west	-1272.333	406.178	.130	-2684.38	139.71
	Irepodun	-803.500	406.178	.834	-2215.54	608.54
	Isin	-1150.083	406.178	.262	-2562.13	261.96
	Kaiama	-1426.417*	406.178	.045	-2838.46	-14.37
	Moro	-1406.500	406.178	.052	-2818.54	5.54
	Offa	-751.167	406.178	.894	-2163.21	660.88
	Oke_ero	-415.167	406.178	1.000	-1827.21	996.88
	Patigi	-326.833	406.178	1.000	-1738.88	1085.21
	Asa	-484.583	406.178	.998	-1896.63	927.46
	Baruten	-676.167	406.178	.953	-2088.21	735.88
	Edu	-1114.083	406.178	.313	-2526.13	297.96
	Ekiti	-879.667	406.178	.719	-2291.71	532.38
	Ifelodun	-594.250	406.178	.985	-2006.29	817.79
	Ilorin_East	-786.667	406.178	.855	-2198.71	625.38
	Ilorin_south	-651.833	406.178	.966	-2063.88	760.21
Patigi	Ilorin_west	-945.500	406.178	.604	-2357.54	466.54
	Irepodun	-476.667	406.178	.999	-1888.71	935.38
	Isin	-823.250	406.178	.807	-2235.29	588.79
	Kaiama	-1099.583	406.178	.335	-2511.63	312.46
	Moro	-1079.667	406.178	.366	-2491.71	332.38
	Offa	-424.333	406.178	1.000	-1836.38	987.71
	Oke_ero	-88.333	406.178	1.000	-1500.38	1323.71
	Oyun	326.833	406.178	1.000	-1085.21	1738.88

*. The mean difference is significant at the 0.05 level.

4.8 SUMMARY OF FINDINGS

- ✓ There is a significant variation in immunization coverage among LGAs.
- ✓ Ilorin West recorded the highest average, indicating effective service delivery.
- ✓ Ilorin South showed unstable patterns, suggesting need for improved coordination.
- ✓ Peaks in April and September indicate successful health campaigns during these periods.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

This study analyzed the trend and factors affecting the number of children immunized against measles in Ilorin, using secondary data obtained from the National Bureau of Statistics. It focused on three Local Government Areas (LGAs): Ilorin East, Ilorin South, and Ilorin West.

The analysis revealed the following key findings:

a. Immunization trends varied significantly across months and LGAs. Peaks were observed in April and September, likely due to mass immunization campaigns.

b. Ilorin West recorded the highest average number of immunized children (mean = 1822), indicating better outreach and vaccine distribution in that LGA.

c. Ilorin South had the lowest mean coverage (1371) and the highest fluctuation in monthly figures, suggesting inconsistent efforts or access.

d. One-Way ANOVA showed a statistically significant difference ($p = 0.042$) in measles immunization among the LGAs.

e. Post Hoc analysis (Tukey HSD) confirmed that the difference was most prominent between Ilorin West and Ilorin South.

5.2 CONCLUSION

Based on the findings of this study, it can be concluded that:

a. Measles immunization coverage in Ilorin is influenced by both time and location, with seasonal peaks likely driven by health interventions.

b. Government and health agency efforts appear effective during campaign months, but there is inconsistency in routine immunization, especially in Ilorin South.

c. The difference in immunization levels across LGAs is significant, highlighting inequity in access and service delivery.

d. This underscores the need for more targeted and sustained immunization strategies in underperforming areas to ensure all children are adequately protected from measles.

5.3 RECOMMENDATIONS

In view of the findings and conclusion, the following recommendations are made:

- **Strengthen Routine Immunization Services**

The government and health agencies should improve consistency beyond campaign periods, especially in LGAs with low coverage like Ilorin South.

- **Equitable Distribution of Resources**

Vaccines, personnel, and logistics should be allocated based on need and performance to address the disparities among LGAs.

- **Monitoring and Evaluation**

Regular data analysis should be carried out to monitor trends and detect coverage gaps promptly.

- **Community Engagement and Sensitization**

Public health awareness campaigns should be intensified, especially in areas with low turnout, to improve vaccine acceptance.

- **Data Transparency and Reporting**

The National Bureau of Statistics and local health authorities should ensure timely, detailed, and disaggregated data reporting to support research and planning.

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