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RESEARCH ARTICLE

A CROSS SECTIONAL ANALYSIS OF MALARIA TRASMISSION AND HEALTH SERVICE NEEDS AMONG NOMADIC POPULATION IN TARABA STATE OF NIGERIA

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ABSTRACT

Malaria is endemic and a major cause of morbidity and death among nomads. Nomadic populations in Nigeria are more susceptible to malaria due to their way of living. They are often excluded from disease control programs because of their high degree of mobility, which makes it more difficult for them to get treatment and preventive measures. Care-seeking behavior patterns, local methods of transmission, and community perceptions of the disease are all taken into account by effective malaria control efforts. To effectively lower the disease burden among the nation's nomads, attention must be paid to the groups most at risk of contracting malaria and the ones least provided with access to basic medical care. The objective of this baseline study is to evaluate the prevalence of malaria and healthcare service needs among the nomadic people in Taraba State. Focus groups, key informant interviews, and household surveys are some of the techniques employed in this study. Incidence, prevalence, and distributions of LGAs with nomad settlements were noted. The acquired data were examined descriptively using percentages, tables, and charts. The findings demonstrate that malaria is a serious public health issue in nomadic groups due to high rates of transmission through environmental exposure, inadequate vector control methods, and restricted access to medical care. The primary risk factors that have been identified include limited access to healthcare and a lack of knowledge and preventive actions, such as bed net use and comprehension of malaria prevention. Improving healthcare services for these vulnerable groups was crucial to reducing the prevalence of malaria and improving overall health outcomes in Taraba State.

Keywords: Focus group, Health care, Nomadic population, Descriptive statistics

INTRODUCTION

Nomadic populations in Nigeria are more susceptible to malaria due to their way of living. They are often excluded from disease control programs because of their high degree of mobility, which makes it more difficult for them to get treatment and preventive measures. Care-seeking behavior patterns, local methods of transmission, and community perceptions of the disease are all taken into account by effective malaria control efforts (Sheik-Mohamed and Velema, 2019)[1]. Malaria is endemic and a major cause of

morbidity and death among nomads. Since there is currently little information available on nomadic groups' attitudes toward malaria and their awareness of malaria control methods, the goal of this study was to address the knowledge gap in these areas. Due to their greater exposure to mosquito breeding grounds and limited access to preventive measures, nomadic populations have a much higher frequency of malaria than do established communities (Akinyele et al., 2021)[2]. According to studies, nomads frequently pass through areas where malaria is endemic, which raises their risk of getting the illness (Ochogu et al., 2020)[3]. Furthermore, long-term malaria prevention efforts designed for stable populations would not benefit them because of their seasonal mobility patterns (Adebayo & Oladimeji, 2019)[4].

The transmission of malaria in nomadic populations is significantly influenced by environmental factors. High transmission rates have been associated with exposure to wooded regions, substandard housing, and close proximity to bodies of stagnant water (Yusuf et al., 2022)[5]. Furthermore, mosquito breeding is impacted by seasonal rainfall patterns and climate variability, which raises the possibility of malaria outbreaks (WHO, 2022)[6]. In order to assess how young Nomads in the public Nomadic primary schools in the Mangu Local Government Area were adopting modern skills, Keswet, Bash, and Kabang (2015)[7] performed a descriptive survey. The study was guided by four research questions and two hypotheses. The population of the study was 189 individuals. 120 students were selected using a simple random sample technique, with no consideration for gender. A survey was used to collect information on young nomads' capabilities. The reliability of the questionnaire, as assessed by Cronbach Alpha, was 0.82 at the significance level of 0.05. Simple percentages and chi-square analysis were used to assess the data gathered for the research questions and the two hypotheses, respectively. In light of these circumstances, the study evaluates the characteristics of nomads in rural areas in a chosen LGA. The results indicated that there were activities in the LGA, but that the young nomads were not as involved in them. The disprovement of both of the null hypotheses demonstrated that the youth engagement in the Local Government differs significantly. Similarly, gender-based enhancements to contemporary activities were rejected.

Nomadic communities often follow an annual cycle of migration in a well-defined and largely regular manner. Their culture and way of life are very different from those of the nearby sedentary groups, despite the fact that the majority of their camps are situated close to them during their migration cycle. Compared to stable groups, Fulani nomads are more susceptible to infectious diseases like malaria due to their way of life. Despite being generally healthier than their indolent rural neighbors, they hardly ever reap the benefits of the conventional health system's interventional programs (Sheik-Mohamed and Velema, 2019)[1].

Malaria is endemic among Nigerian nomads, with statistics indicating a frequency of about 37% even during the dry season (Akogun, 2012)[8]. Malaria, also called Pabboje in the local dialect, has long been seen by Fulani nomads as a sickness that is inherent to the Fulani people and doesn't need to be treated because it "visits for a while and goes away." It is believed that current antimalarial drugs make recurrent malaria episodes worse. Even in the absence of symptoms, nomadic Fulani people may carry a substantial parasite burden for malaria, according to anecdotal data and their complacent attitude toward the disease. As a result, the Fulani, a nomadic population of Nigerians, run the risk of interfering with current attempts to eradicate and manage malaria, along withMalaria, also called Pabboje in the local dialect, has long been seen by Fulani nomads as a sickness that is inherent to the Fulani people and doesn't need to be treated because it "visits for a while and goes away." It is believed that current antimalarial drugs make recurrent malaria episodes worse. Even in the absence of symptoms, nomadic Fulani people may carry a substantial parasite burden for malaria, according to anecdotal data and their complacent attitude toward the disease. Malaria is endemic among Nigerian nomads, with statistics indicating a frequency of about 37% even during the dry season (Akogun, 2012)[8]. Due to socioeconomic hurdles, inadequate infrastructure, and geographic isolation, nomadic populations have very limited access to healthcare (NMEP, 2021)[9]. According to a 2020 study by Ochogu et al., nomadic people in Taraba State frequently have to travel great distances to the closest medical institution, which causes delays in diagnosis and

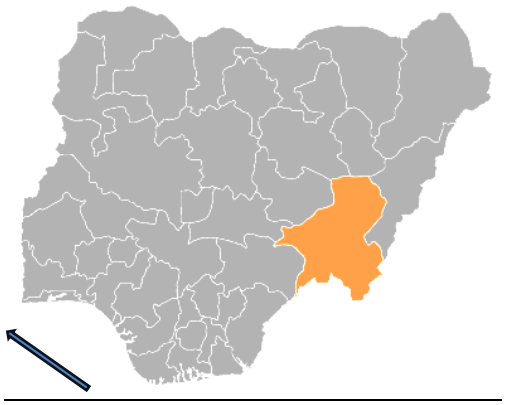
treatment. Additionally, a lot of nomads depend on self-medication and traditional healers, which might lead to poor malaria treatment and additional consequences (Bello et al., 2020)[10]. Poor access to healthcare is also a result of financial limitations. Many nomadic families cannot afford antimalarial drugs and diagnostic services because of their poor incomes and lack of health insurance (Akinyele et al., 2021)[2]. The exorbitant expense of commuting to far-off medical facilities deters many from obtaining treatment.

METHODOLOGY

Study Setting

Taraba is a state in north-eastern Nigeria, the state has a population of more than 3,609,800, which is the peak. Taraba state has a population density of roughly Projection 58,795 km² Surface 61.40/km² Population Density. Taraba state has about 80 distinct ethnic groups and their languages in the state. Taraba state is bordered in the west by Nasarawa state and Benue state (for 109 km), northwest by Plateau state for 202 km (126 miles), north by the Bauchi state for 54 km and Gombe state for 58 km, northeast by Adamawa state for about 366 km and south by Northwest Region in Cameroon for about 525 km. The Benue, Donga, Taraba and Ibi are the main rivers in the state. They rise from the Cameroonian mountains, draining almost the entire length of the state in the North and South directions to link up with the River Niger (Ducrotoy, 2017)[11].
The climate of Taraba state is marked by an annual average temperature of 33°C but high level of cold in January and an increased rainfall in August.The percentage of rainfall in Taraba state is 40.35% with 54.98% relative humidity. The state is usually very warm in March with 40.44°C, and an average wind of 8.84 km/h. Many homes and commercial buildings in Taraba State are affected by flooding, including those in the suburbs.According to DHIS2 Taraba State has 1395 hospitals and health care centers out of which 1151 (83%) are functional, 1006 (72%) are public, 145 (10%) are private (Folarin, 2021)[12].

Figure 6: Map of Nigeria showing Taraba state



Taraba state

Study design

The study analysis is from secondary (quantitative) data obtained from DHIS2[13]. The study analysis involved all the health facilities in the 16 Local Government Areas (LGAs) of the state. Taraba state have reported high test positivity rate (an average of 77.4 %) over the last 5 years (2017 to 2022) which made Taraba one of the highly endemic states in the country. The nomads are located in 10 (63%) out of 16 LGAs in Taraba state.

Study population

The study covered LGA, wards and health facilities in Taraba state. Using health facility data submitted to the state by individual LGAs.

Sampling Methodology and Selection

The assessment consists of several key components:

1. Routine sources such as secondary data available in the SHMIS/DHIS2[13],
2. Non-routine sources such as the SDHS/SMIS.
3. Desk review, which primarily focused on documents available at the state, region, and district levels and other assessments conducted in the past five years.

Data collection methods

Desk review

The assessment was centered on data from programmatic intervention reviews, other available grey literature on Nomads, primary and secondary data that were recently published in official datasets. The data used contained stakeholders and program implementers that were interviewed to supplement this strategy. Review of published articles, published reports, unpublished reports (i.e. grey literature), program documentation, and data were all included in the ensuing literature search. Google Scholar databases, Pubmed, overview was all used in the search. The evaluation also made use of national health management information system (HMIS) data and the National Malaria Control Programme. The prevalence of the disease, the geographic distribution of cases, risk factors associated with the nomadic population, and the management of malaria programs, which includes strengthening health systems, were all given special consideration in the desk review.

Inclusion and Exclusion criteria

Malaria program data, and nomad data are among the inclusion criteria for the desk review; data unrelated to malaria, nomad data, and data publications older than ten years are among the exclusion criteria.

The following sources were used to analyze non-routine data:

(a) Malaria stratification data
(b) National Malaria Strategic Plan 2021 – 2026
(c) Census of population
(d) Household and Facility surveys such as NDHS/MIS/MICS
(e) Malaria Indicator survey data
(f) Publications

Data Analysis

The distributions of LGA's having nomad settlements, incidence, and prevalence. And the data obtained were analyzed descriptively using percentage, tables and charts

RESULT

The purpose of this section is to provide trends of analysis for malaria mortality, reporting rate and timeliness, clients attendance, persons tested by RDT/microscopy, persons tested positive by RDT/microscopy, ANC uptake, health facility distributions.

Table 1:Trends in malaria mortality and mobidity

Period	Deaths < 5	Deaths < 5 Malaria - U5	Proportion of <5 deaths caused by malaria
2020	251	109	43%
2021	200	117	59%
2022	226	125	55%
2023	133	77	58%
2024	254	97	38%

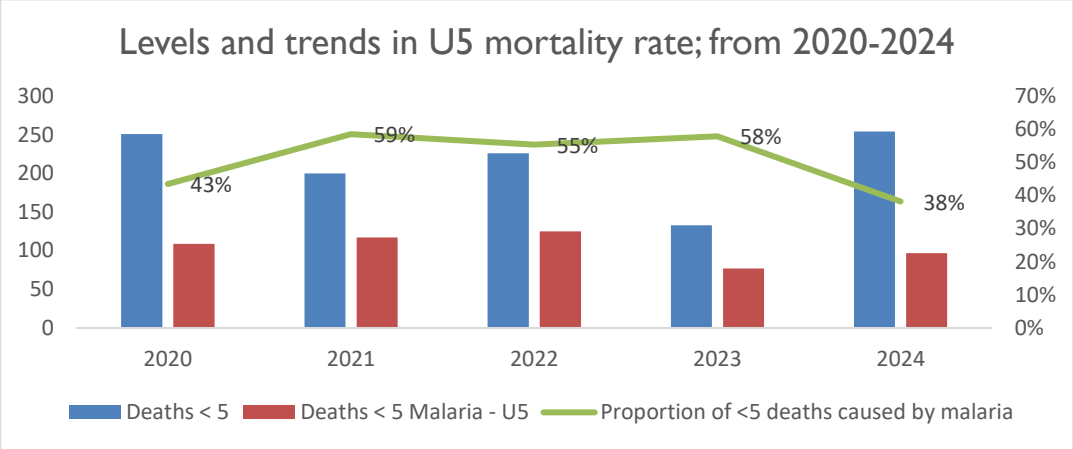


Figure 1: Plot of Table 1

Figure 1 illustrates the trend of malaria mortality. In 2020, malaria-related deaths accounted for 43%. The highest proportion was recorded in 2021 at 59%, followed by 2023 with 58%. In 2022, the third-highest mortality rate was observed at 55%, while 2024 reported the lowest at 38%.

Table 2:Malaria burden in Taraba state

	2020	2021	2022	2023	2024
Malaria Tested	400910	452927	619526	773926	959133
Malaria Confirmed Cases	297792	340742	480895	595179	715478
TPR%	77.00	77.00	79.00	78.00	76.00
API per 1000 Pop.	88.2	97.6	133.4	166.0	197.2

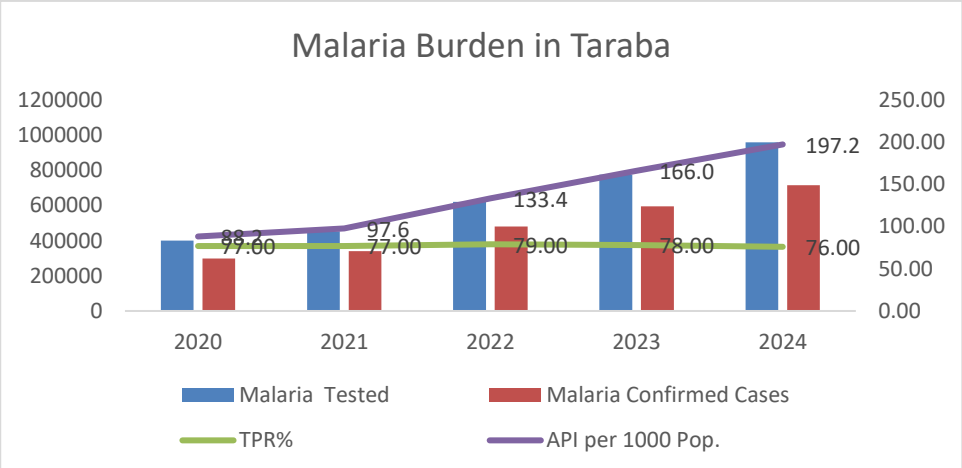


Figure 2: Plot of Table 2

Figure 2 illustrates the trend of malaria burden. In 2020, 88.2% of individuals were tested for malaria using RDT or microscopy, with 77% confirmed cases. The testing rate increased to 97.6% in 2021, while confirmed cases remained at 77%. In 2022, the test rate rose to 133.4%, with malaria cases at 79%. In 2023, testing reached 166%, with 78% confirmed cases, and in 2024, the test rate peaked at 197.2%, while malaria cases stood at 76%.

Table 3:Malaria burden in Taraba state

TPR	2020	2021	2022	2023	2024
Ibi	90%	89%	94%	81%	85%
Takum	73%	90%	97%	91%	80%
Ussa	93%	73%	87%	87%	79%
Yorro	92%	89%	83%	79%	71%
Ardo-Kola	79%	86%	84%	81%	78%
Kurmi	80%	84%	81%	74%	78%
Donga	73%	78%	82%	79%	79%
Bali	74%	80%	82%	81%	73%
Gashaka	70%	80%	78%	76%	79%
Jalingo	88%	74%	75%	69%	73%
Karim-Lamido	73%	71%	66%	78%	83%
Sardauna	72%	72%	70%	79%	71%
Zing	73%	76%	73%	70%	70%
Lau	73%	69%	63%	72%	75%
Gassol	58%	59%	93%	75%	67%
Wukari	70%	65%	64%	72%	71%

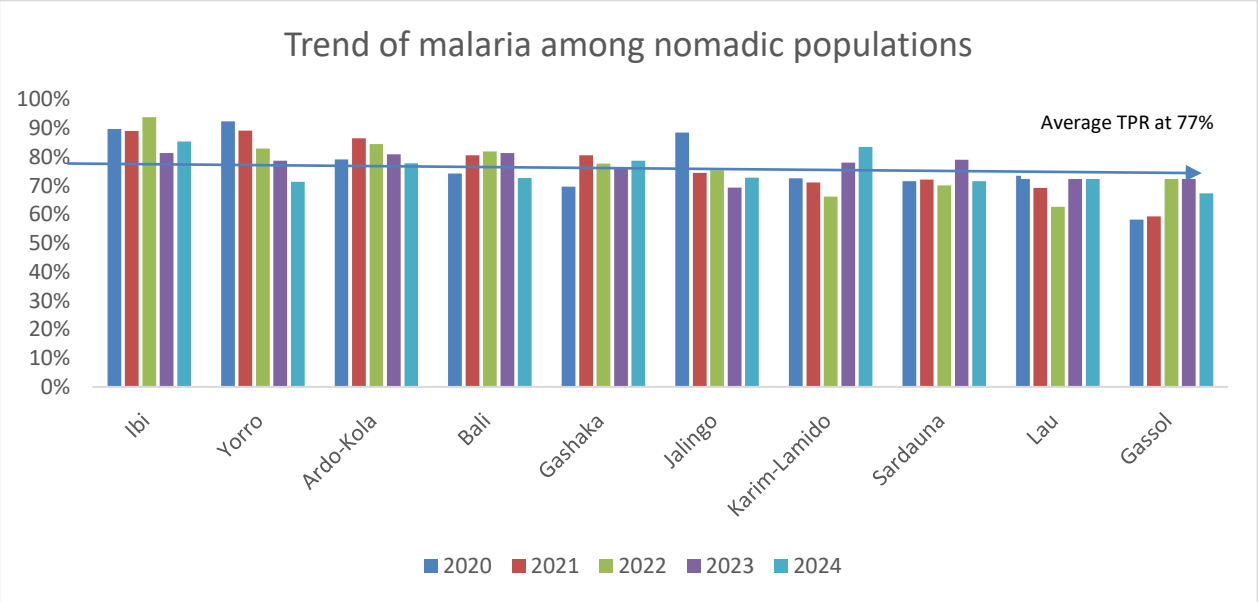


Figure 3a: Plot of Table 3

Figure 3a illustrates the trend of malaria burden. Among the 10 LGAs predominantly occupied by nomads, 5 (50%) exceeded the 5-year average TPR of 77%. The remaining 5 (50%) fell below this average, with Gashaka and Jalingo each at 76%, Karim-Lamido at 74%, and both Lau and Gassol at 70%.

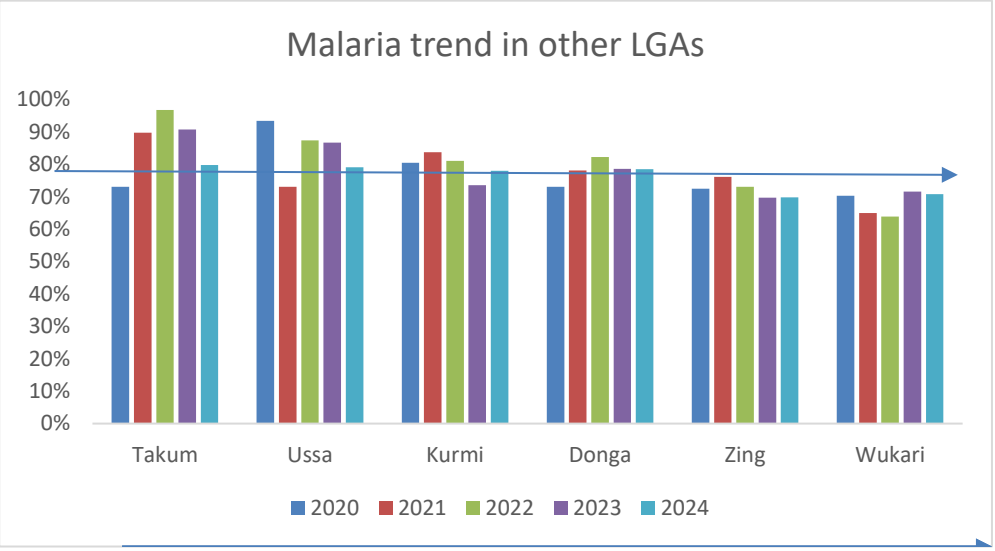


Figure 3b: Plot of Table 3

Figure 3b illustrates the trend of malaria burden. Among the six other LGAs, three (50%) recorded a TPR below the 5-year average of 77%. These include Sardauna at 73%, Zing at 72%, and Wukari at 68%.

Table 4a: the status of health facilities

Total	**1395**	**100%**
Not Reporting	240	17%
• **Public**	192	14%
• **Private**	48	3%
Functional	1151	83%
• **Public**	1006	72%
• **Private**	145	10%
Total reported in 2024	911	65%
• **Reported (public)**	814	58%
• **Reported (private)**	97	7%
Not functional	244	17%

Table 4b: the distribution of health facilities by LGA

LGA	Functional	Non-functional	Total Health Facilities
Ardo-Kola	55	18	73
Bali	91	33	124
Donga	46	41	87
Gashaka	60	8	68
Gassol	106	9	115
Ibi	44	8	52
Jalingo	84	1	85
Karim-Lamido	115	6	121
Kurmi	47	5	52
Lau	62	10	72
Sardauna	94	5	99
kum	69	24	93
Ussa	76	21	97
Wukari	81	43	124
Yorro	61	10	71
Zing	60	2	62

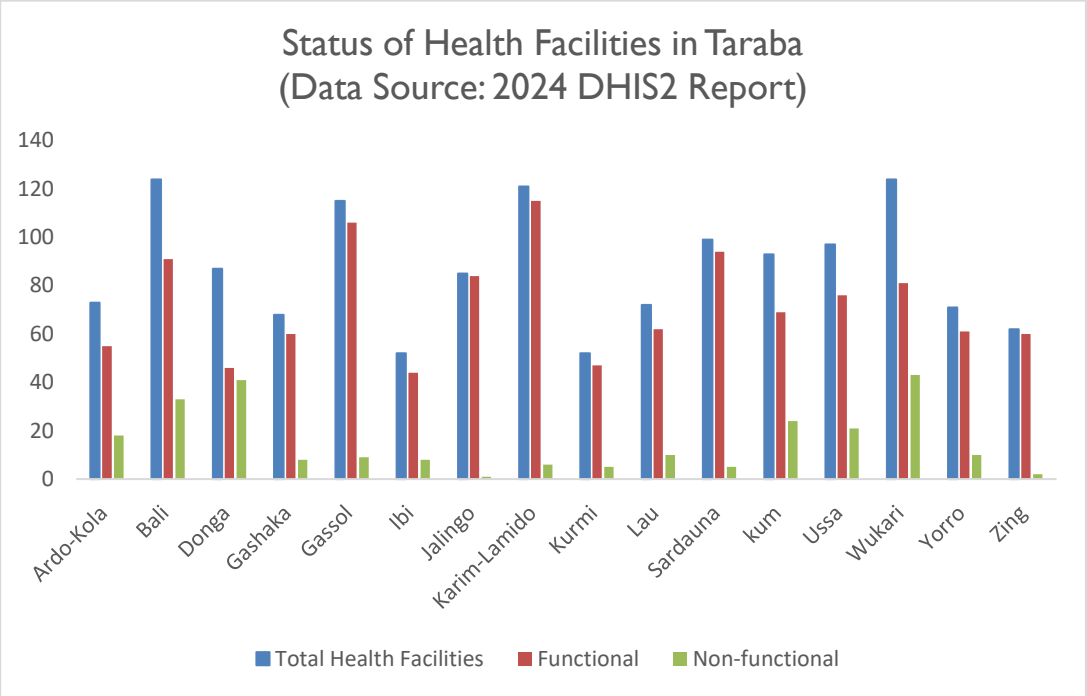


Figure 4a: Plot of Table 4a

Figure 4a illustrates the distribution of health facilities. As of 2024, data from DHIS 2 indicates that Taraba State has 1,395 health facilities, of which 244 (17%) are non-functional. Donga LGA has the highest number of non-functional facilities, with 41 out of 87 (47%) not in operation.

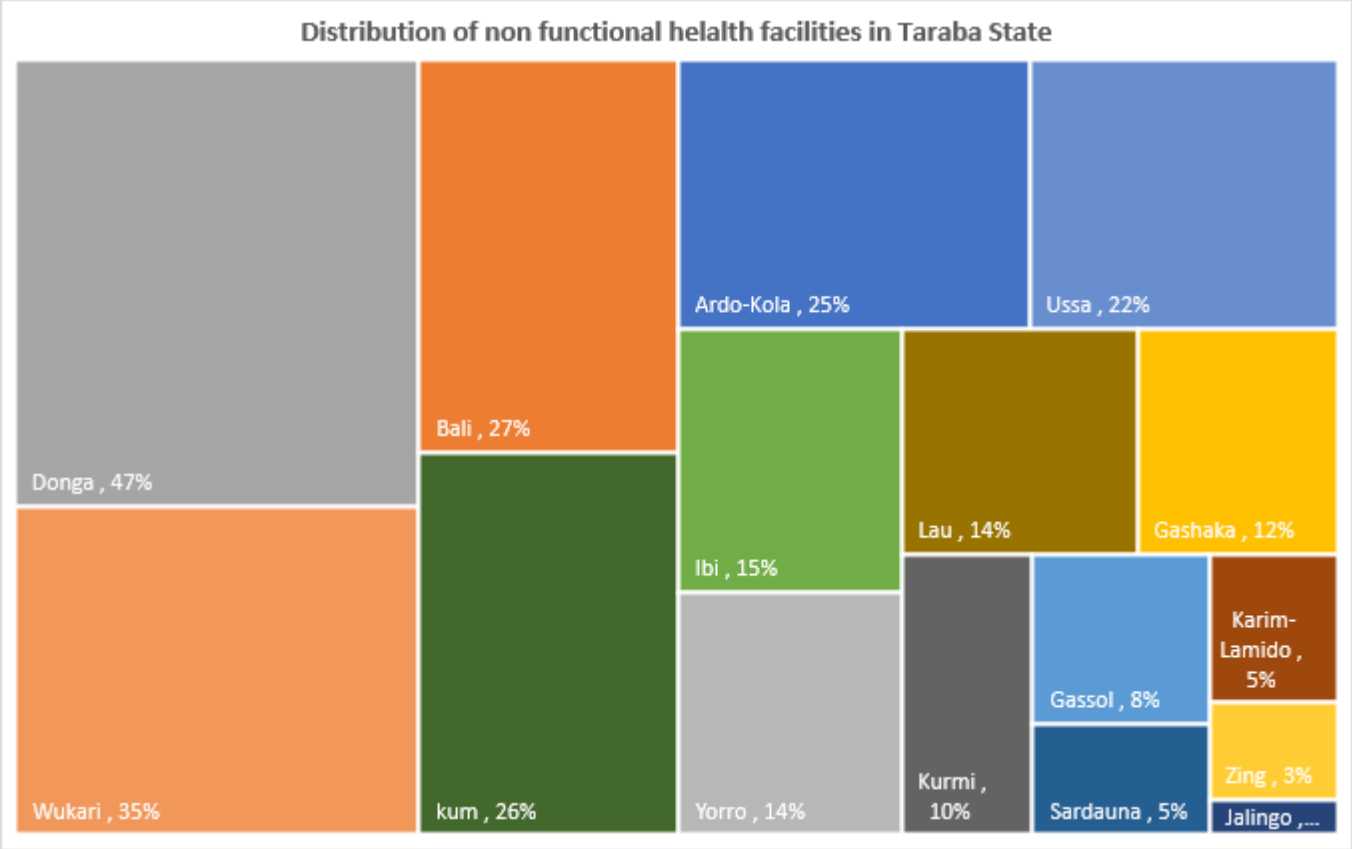


Figure 4b: Plot of Table 4b

Figure 4b illustrates the distribution of health facilities. Donga LGA has the highest number of non-functional facilities, with 41 out of 87 (47%) not in operation, while Jalingo LGA has the lowest, with only 1 out of 85 (1%) non-functional.

Table 5: the distribution of clients attendance

Period	Out-patient Attendance	Persons with fever	Proportion of persons with fever
2020	609588	432305	71
2021	615440	463328	75
2022	928415	639717	69
2023	1060783	795338	75
2024	1260060	994776	79

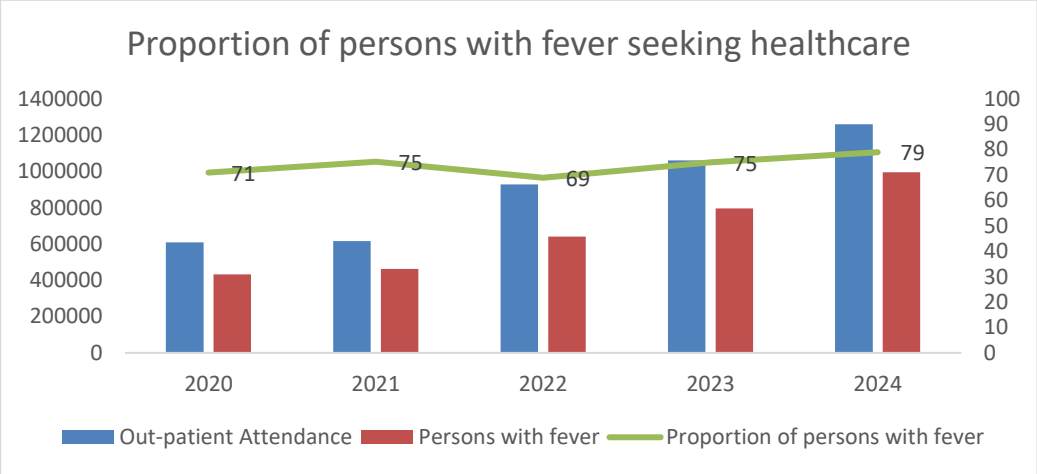


Figure 5: Plot of Table 5

Figure 5 illustrates the distribution of health facility attendance based on clients presenting with fever. The majority of outpatient visits are due to fever. The proportion of individuals with fever was 71% in 2020, 75% in 2021, 69% in 2022, 75% in 2023, and 79% in 2024.

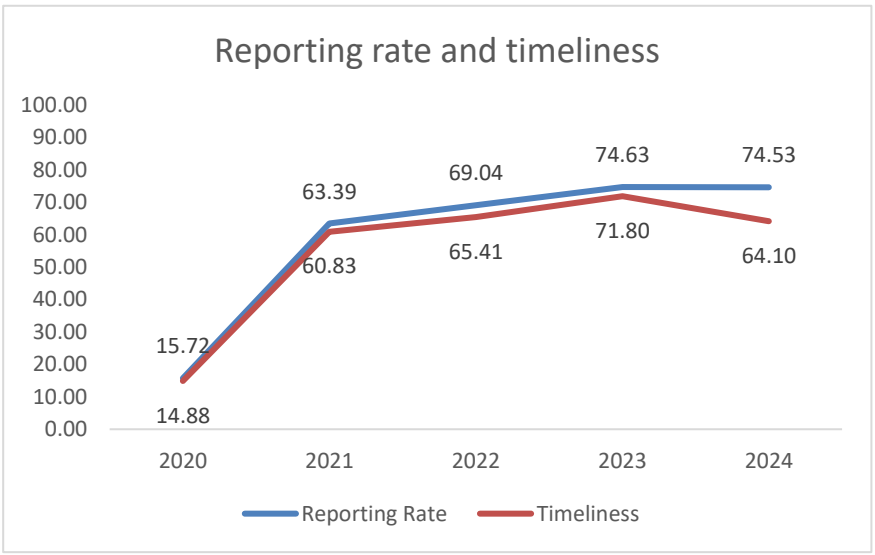


Figure 6: Plot of Table 6

Table 6: Taraba state reporting rate and timeliness

Reporting	2020	2021	2022	2023	2024
Reporting Rate	15.72	63.39	69.04	74.63	74.53
Timeliness	14.88	60.83	65.41	71.80	64.10

Figure 6 illustrates the trend of reporting rate and timeliness. In 2020, the reporting rate was 15.7%, while timeliness stood at 14.8%. These figures increased to 63.3% and 60.8% in 2021, then improved to 69.0% and 65.4% in 2022. The trend continued with 74.6% and 71.8% in 2023, followed by 74.5% and 64.1% in 2024. Despite these improvements, both reporting rate and timeliness remain below the national target of 80%.

Table 7: distribution of IPTp up take by year

Data Element	ANC 1st Visit	IPTp1 Uptake	IPTp2 Uptake	IPTp3 Uptake	IPTp4 Uptake
2020	19192	453%	318%	10%	10%
2021	82082	58%	32%	15%	10%
2022	94521	69%	43%	20%	11%
2023	106226	68%	41%	24%	13%
2024	113861	68%	39%	25%	16%

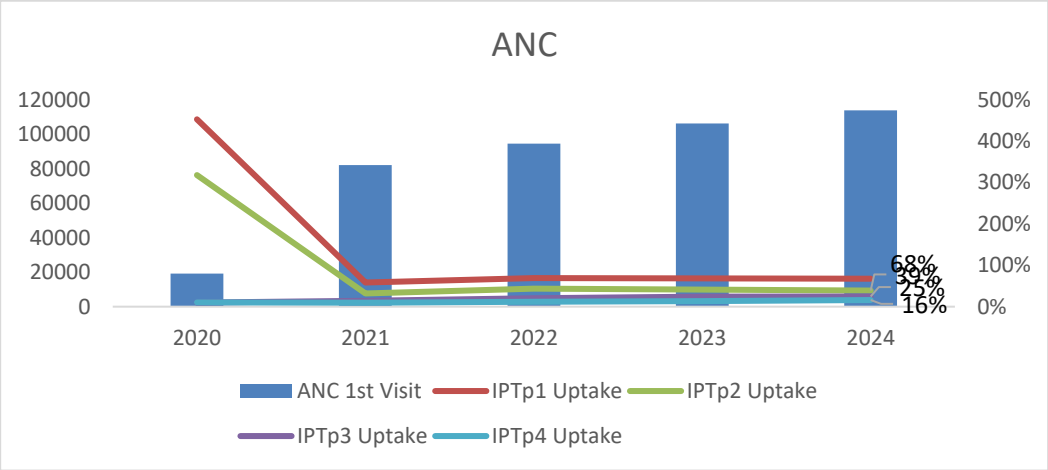


Figure 7: Plot of Table 7

Figure 4.7 illustrates the trend of malaria prevention through IPTp uptake. In 2020, IPTp1, IPTp2, IPTp3, and IPTp4 recorded the highest uptake at 453%, 318%, 10%, and 10%, respectively. In both 2021 and 2022, the uptake for IPTp1, IPTp2, IPTp3, and IPTp4 was 58%, 32%, 15%, and 10%. In 2023, the rates increased to 68%, 41%, 24%, and 13%, respectively. By 2024, IPTp1 uptake remained at 68%, while IPTp2, IPTp3, and IPTp4 were at 39%, 25%, and 16%, respectively.

CONCLUSION

High malaria prevalence, particularly during the rainy season, driven by environmental and behavioral factors. Poor health-seeking behaviors due to distance, financial barriers, and cultural perceptions. Low utilization of preventive measures like Treated Mosquito nets, cleaning of surrounding, poor/ lack of functional health facilities are the most contributed factors to the prevalence of Malaria transmission among nomadic population in Taraba state. Malaria remains a significant public health concern among the nomadic population in Taraba State due to environmental, socio-economic, and healthcare access challenges. Targeted interventions such as mobile clinics, health worker training, and increased health education can significantly reduce malaria burden in this population. It is therefore recommended that

mobile clinics should be established to provide malaria diagnosis and treatment and bring healthcare services closer to nomadic communities.

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