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Categorical Data Analysis on the Use of Antimalarial Drugs on Adult Patients in Yenagoa, Bayelsa State

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Abstract
Anti-malarial drugs are drugs used to treat or prevent malaria in endemic countries. The purpose of this work was aimed at analyzing the use of anti-malarial drugs on adult patients in Federal Medical Centre (FMC), Yenagoa. A systematic random sampling technique was used to select the sample size of 5230 patients' folder from available records which consisted of 2458 and 2772 male and females respectively. An archival-descriptive research design was used which enabled the study obtained data from General Out Patient Department (GOPD). Data obtained were analyzed by using tables, bar chart, pie chart and chi-square statistical test. Four null hypotheses were tested at 0.05 alpha level of significance which HO_1 was retained, while HO_2, HO_3, and HO_4 were rejected at df_3 of critical X^2 value of 7.815. Result from the analysis of sex ratio gave male-female ratio was 89:100, indicating more females were treated however the difference was not significant. It was tested and observed that four different categories of anti-malarial drugs were used in the year 2012 and all the used anti-malarial drugs showed side effects. Meanwhile, Artemisinin Combination Therapy was most frequently used in the health facilities. Based on the findings, conclusions were drawn and recommendation were made that government, World Health Organization and other non-governmental agencies should hasten the development of malaria vaccine and ACTs should be available at all times for the treatment of adult patients with malaria.
Keywords: categorical data, antimalarial drugs, general out-patient department (GOPD), malaria.

1. INTRODUCTION

Malaria disease is an age long disease that has been in the medical literature for approximately 30 million years (Carter & Mendis, 2002). The name malaria was derived from 'mal' 'aria' meaning 'bad air'. To Opeskin (2008), this meaning was borne out from the ancient Romans who thought that the disease came from the foul gases released from soil, water and air. Nevertheless, malaria has been noted as wide spread and potentially lethal infectious disease which has afflicted people for much of human history and affected settlement patterns in Africa, especially Nigeria.

Fairhust and Wellems (2010) identified that malaria is caused by infection with sporozoa of the genus plasmodium, transmitted in nature by the bite of the female anopheles mosquito. In Nigeria, the authors emphasized that over three quarters of malaria infections is caused by plasmodium falciparium which is followed by plasmodium malaria and plasmodium ovale. This is to say that among the four species of plasmodium that cause malaria infection, plasmodium vivax is seldomely noticed.

Consequently, malaria is a highly endemic disease in Nigeria and according to Hartman, Rogerson and Fischer (2010), it is one of the major cause of ill-health and deaths especially in children. However several control measures have been developed to control spread of the disease. One of such measure is the use of anti-malaria drugs but it has been observed that patients are still dying of the disease. What, then, is the anti-malaria drugs used in the treatment of malaria infection in this part of Nigeria.

This, sturdy, therefore purposed to categorically analyse the use of anti-malaria drugs in adult patient treated in Federal Medical Centre, Yenagoa. The study was guided by the following questions.

a. Which are the different categories of anti-malaria drugs used in the treatment of malaria infection in FMC for the year 2012?

b. Which category of anti-malaria drug is frequently administrated in treating adult patient with malaria?

There is no gain saying that available literatures identified several categories of anti-malaria drugs. Nayyar, Bremain, Newton and Hemington (2012) identified quinine as an anti-malaria drug but it is capable in causing hypoglycaemia through its action of stimulating insulin secretion. Until recently, chloroquine was the most widely used anti-malaria drug. Patricia (2008) posited that chloroquine is an aminoquinoline compound with an ampheated and still unclear mechanism of action. It has a significant antipyretic and anti-inflammatory effect when used to treat plasmodium vivax infections and thus if may still remain useful even when resistance is more wide spread (Patricia).

The world health organization (WHO), (2010), in its guidelines revealed amodaquine in a combine formulation with alternate (ASAP). Amodiaquine is similar to chloroquine and effectively used in areas of

chloroquine retrotance while some patients prefer its tendency to cause less iteling than chloroquine.

Another anti-malarial drug is pyrimethemine. This anti-malarial drug is used in the treatment of uncomplicated malaria.

According to Ferri (2008), pyrimethanmine is only used in concert with a sulphonamide.

Proquanil is a synthetic derivative of pyrimidine. It is useful in prophylatin when combined with atovaguone or chloroqunie (Ferri, 2008). Sulfonamudis, mefloquine, Atovaquine, primaquine, halofamtrine and Artenmisimin are other anti-malarial drugs used either alone or in combination with another for the treatment of malaria (WAI, 2010). Current practice in treating malaria cases is now based on the concept of combination therapy (WHO, 2010).

This study observed that not all aforementioned anti-malarial drugs are used in Federal Medical Centre, Yenagoa.

2. METHOD:

The purpose of this study was to carry out a categorical data analysis on the use of anti-malarial drugs on adult patients in Federal Medical Centre, Yenagoa in the 2012. Specifically, thin study was to identify the sex ration of malaria attacks on adult patients, the categories of anti-malaria drugs used and the most frequently used anti-malarial drug in Federal Medical Centre, Yenagoa. The study also tested the following hypothesis.

- Anti-malarial drugs used in adult patients have no significant association among male and female.
- Categories of anti-malaria drugs used in treatment of malaria in adult patients have no significance association.
- Number of patients having side effects after taking anti-malarial drugs have no significance association.
- Categories of anti-malarial drugs frequently administered have no significant association.

The study adopted an archival/descriptive survey research designs which enabled the study randomly selected from available records, 5320 adult patients folders who were infected and treated malaria in FMC from January – December, 2012. A consisted of 2458 and 2772 male and female folders respectively. The data were gathered from the FMC, Yenagoa after gaining an ethical approval from the institution. The data were collected from the folders of selected patients with malaria. It was from the demographic section and treatment plan of the patient folder that all data were collected. This is shown in table 1. Categorical data were analysed with tables, bar chart and chi-square (X^2) for the hypothesis at 0.05 level of significance.

3. RESULTS:

The results presented below are used to answer the research question and test the four null hypotheses at 0.05 level of significance.

Table 1. Number of adult patients treated of malaria by gender from January – December, 2012 in FMC Yenagoa

MONTHS	NUMBER OF PATIENTS	GENDER	
		MALE	FEMALE
JANUARY	295	135	160
FEBRUARY	454	254	200
MARCH	560	250	310
APRIL	370	150	220
MAY	381	189	192
JUNE	519	280	239
JULY	538	288	250
AUGUST	557	235	322
SEPTEMBER	227	77	150
OCTOBER	519	235	284
NOVEMBER	456	223	233
DECEMBER	354	142	212
TOTAL	**5,230**	**2,485**	**2,772**

Table 1 show that more adult females were treated of malaria than males, resulting a sex ratio of approximately 89 males to 100 females.

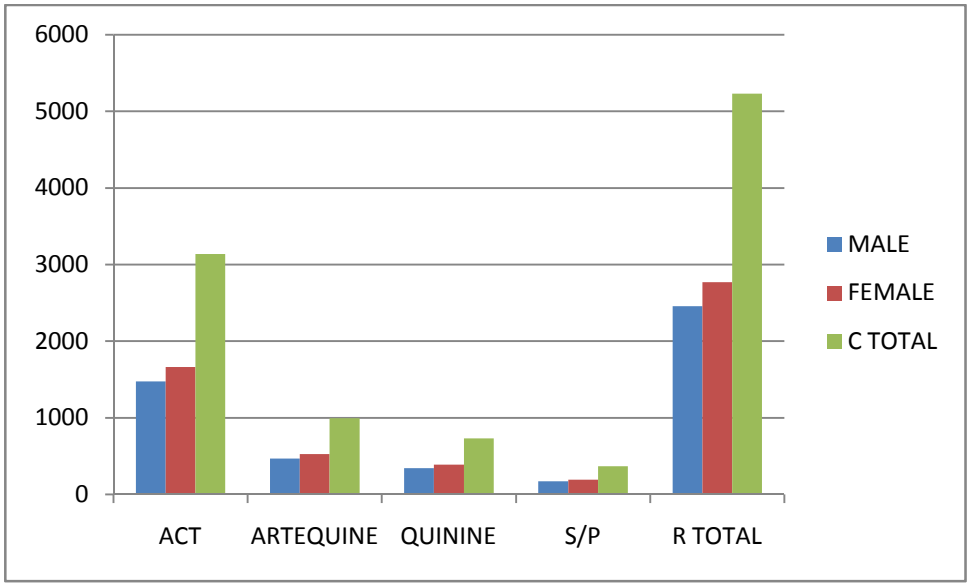

Figure 1: A multiple bar chart representing categories of anti-malaria drugs used for multiple treatment of malaria 2012.

Figure 1 depicts that ACT, Artequine, Quinine and S/P were different categories of anti-malaria drugs used in treating adult patients with malaria in FMC, in the year 2012. The graph also shows that ACT was the most frequently used anti-malaria drugs in Federal Medical Centre, Yenagoa. Figure 1 also present use of antimalarial drugs by gender, indicating that female uses all categories of antimalarial drugs than males.

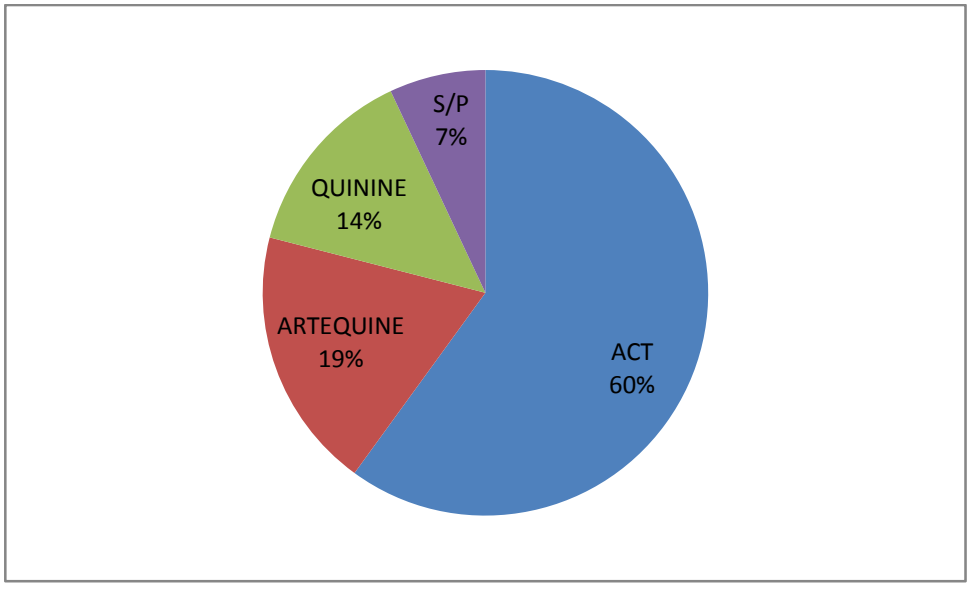

Fig 2. Pie chart showing categories of anti-malarial drugs administration at FMC Yenagoa in 2012

Figure 2 shows categories of antimalarial drugs administration at FMC, Yenagoa. This indicates that at FMC, Yenagoa ACT(60%) is most frequently administered than all other categories of malarial drugs while S/P(7%) is the less administered drug at FMC.

Table 2. Summary of chi-square (X^2) analysis for the four null hypotheses

Ho	Cal. X^2	X^2 – Critical	Sp Level	DF	Decision
1	0.00	7.82	0.05	3	Retain Ho
2	78.34			3	Reject Ho
3	41.8			3	Reject Ho
4	78.34			3	Reject Ho

Table 2 showed a calculated chi-square value of 0.00, 78.34, 41.8, and 78.34 with 3 degrees of freedom and

a critical value of x^2 value of 7.82. The cal. x^2 for the Ho is less than the critical x^2 at 0.05 chosen alpha hence the association is not significant. The conclusion here would be that the categories of anti malaria drugs used in treating adult patients have no significant association among male and females. HO_2, HO_3, and HO_4 were all rejected at 0.05 alpha levels. This implies that association of anti-malaria use is highly significant. The number of patients having side effects after using categories of anti malaria drugs has a significant association.

4. Discussion

From the result of this study, it has been observed that nearly four categories of anti malaria drugs are frequently used at Federal Medical Centre, Yenagoa in the year 2012. Artemisinin combination therapy(ACT), Adequine, Quinine and sulfadorcine/pryrimethamine (s/p). Figure1 shows the monthly usage of the drug which indicates that ACT was the most frequently used drug. This finding is in line with (WHO,2012). The table 1 showed that in the month of March, August, July, June and October the number of malaria patients that visited the centre was high (150, 557,538, 519, & 519 respectively) why the month of September was the least (227). It has been on record that malaria risk is highest from October to May in South Africa (MD travel health.com, 2013). In this study it was revealed that more females were treated of malaria with the categories of anti-malaria drugs than males; having sex ratio 89:100 (Males: Females). The hypothesis of no association of treatment of malaria among gender with anti-malaria drugs was not significant. Therefore the ratio difference of 11 is not a significant value. This implies that malaria treatment of male is independent of female in the use of anti-malaria drugs. The sturdy finding does not regard the observation of information on malaria (2012). It was observed that malaria infection on pregnant women may be more severe than in non pregnant women who determine the selection of anti- malaria drugs to be given to avoid possible adverse effect.

From the findings the study observed that the use of anti-malaria drugs have significant association, meaning usage was not independent to one another. Similarly, the anti-malaria drugs ability to give side effects to users was not significant. Available literatures reveal that many of the side effects of malaria medication are less pronounced when the medication is taken with meals. In general, the side effects of anti-malaria drugs are very similar (www.echo.com). Also, Nayyar, Breman, Newton and Herrington (2012) supported the findings that Quinine has the highest level of side effects on patients but it is characterized by most common symptoms. Opeskin (2008) stated that there is a need for prompt and concerted action on malaria at the National, regional and International levels if the public health concerns arising from the disease are to be adequately addressed. Artemisinin based combination therapy (ACT) is the first line treatment for uncomplicated falciparium malaria. Use of ACT has shown success in this preventable and treatable disease but resistance is emerging creating the need for new therapies, remarked Nosten et al. (2012). This is in agreement with the findings of the study.

5. Conclusion

The sturdy concludes that at Federal Medical Centre Yenagoa, four categories of anti-malaria drugs were used to treat adult patients with malaria infection in the year 2012. All the anti-malaria drugs prescribed indicated predisposed patients in having side effects. The study also concludes that females use more of prescribed anti-malaria drugs male counter parts.

6. Recommendation

Base on the findings and conclusions drawn the following recommendations were made.viz;

- ❖ World Health Organization and other non-governmental organization should support the formulation of vaccine to enhance possible malaria eradication programmes.
- ❖ Hospitals should follow World Health Organization guideline in Malaria treatment to avoid undesirable risk to patient.
- ❖ Government and non-governmental organizations and international health agencies should take more proactive measures to reduce the rate of infection of malaria in adult patients.
- ❖ ACTs should be made available at all times for the treatment of adult malaria.
- ❖ More effective anti malarial drugs should be used to complement the use of ACTs for the treatment of malaria.

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