COMPARATIVE ANALYSIS OF MALARIA PREVALENCE AMONG COMMUNITIES PRACTICING IRRIGATED AND NON – IRRIGATED AGRICULTURE IN GARIN – MALLAM L.G.A, KANO STATE

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ABSTRACT

We investigated the prevalence of malaria and associated risk factors in Garin-Mallam Local Government Area Kano state. Systematic random sampling was used for questionnaire administration in the respective households as it is shown above such as 5 settlements for Garun-Mallam, 2 settlements for Garun-Babba and 3 settlements for Makwaro. Malaria prevalence was associated with low hemoglobin concentration, low socioeconomic status, and agricultural activities of the community. Our findings indicate that Garin-Mallam is seriously affected by malaria and that irrigated agriculture may increase this risk. It was found that the age group affected by malaria in the two communities' respondents of age ranges between 0 – 17 years has the highest risk of malaria disease with 70.0% and 50% of the total malaria infected in both the non – irrigated and irrigated community respectively. And also, the irrigated community has occupied the highest percentage of malaria prevalence with about 97.0%, while the non-irrigated community occupies about 87.0% of the total respondents of the non – irrigated category, while the remaining respondents were either having cholera, typhoid or measles for the balance of the total number sampled. In general, the irrigated community were of the opinion that "Agricultural activities spread malaria" with about 89.0%, while the remaining respondents were of the opinion that "Agricultural activities doesn't spread malaria" with about 11.0%. And non – irrigated community were of the opinion that "Agricultural activities spread malaria" with about 46.0% and those of "Agricultural activities don't spread malaria" with about 54.0% in this categories".

Keywords: Irrigated, Non-irrigated, Communities, Malaria.

1.0 Introduction

The high population growth rate of the African continent has, on the one hand, led to an increased demand for food. With such high population, there is higher demand for food. These out-strip the agricultural production. In order to meet this need, many governments have sought ways of improving food production by initiating large–scale irrigation projects, and small–holder fadama irrigation as a solution to the impending food shortage and to encourage economic growth. However, irrigation has often been blamed for aggravating diseases in local communities (Ijumba JN, 2001). Garun-Malam Local Government area is located at 8^{o}25E and 11^{o}35N. It was created and curved out from Kura local government area. It is situated in the southern part of Kano State, which is about 45km from the state capital Kano, it cover an area of about 4005sqkm. Garun-Malam shares border with four local government areas. Kura to the north, Bebeji and Madobi to the West, Rano to the south and Bunkure to the east. Garun-Malam local government has a population of about 116,494 people as at 2006 National Population Census (NPC 2007). The implication of this high population is that, it results in high intensification of agricultural activities which is the major occupation of the inhabitant in the area. The study area is part of the Kano – Zaria plains, a vast, almost flat plain area, which extended almost continuously from Sokoto to Lake Chad. The area varies in height from 1,700feet and, higher near Garun Babba and Rano to 1,400 feet in the north near Dan Hassan. The direction of the general terrain slope is north-east. The local relative relief ranges from almost flat to gentle slopping. Occasionally the relief is broken by rocky inselbergs, which are mainly situated outside the study area. Some of them, however, are located within Bunkure Forest reserve near Rano (NAECO, 1974, in Maitama 2004). Malaria is one of the major tropical killer diseases associated with irrigation schemes and it is important to look at the impact of irrigation on malaria transmission and how it affects the health care status of the local communities, side by side with non irrigated communities. This research intends to raise issues on the two-way effects of irrigated agriculture and malaria transmission. The study will look at the economic impact of the reported episodes of illness and long term disabilities which are the major causes of under development in many countries today. The economic burden of malaria alone has cost Africa billions of dollars in addition to the cost of lost working days. The cost of treatment for repeated bouts of malaria can also be a huge burden for the poorest families. Malaria today is a disease of poverty and under developed countries. In Africa, mortality remains high because there is limited access to treatment in the villages. We should therefore, use basic research to develop better tools for the control and cure of malaria in order to reduce highest percentage of school and office absenteeism. Since the inception of the Roll Back Malaria Initiative of the World Health Organization in 1998, and particularly since the Abuja Malaria Summit in 2000, malaria prevention and control have once again received the attention of the international community. The development of irrigation scheme is widely recognized as a key for promoting economic growth, ensuring food security and alleviating poverty in most developing countries (Lipton et al. 2003). Both large-scale and small-scale irrigation schemes contribute significantly to agricultural production in the country. However, as a result of the environmental modifications that occur with irrigation development some negative impacts on the environment have been associated with the practice. Indeed, past experience shows

that inadequate consideration of public health aspects can seriously undermine the sustainability of such schemes (Hunter 1993; MC Cartney et al. 2007).

3.0 METHODOLOGY

This section deals with the methodology involved in carrying out this study, from the data collection procedure up to the level of data analysis techniques that yielded the general summary and inferences of all the collected data for the study. The methodology was organized under the following headings:

3.1 Data types and sources

Data were obtained from two main sources, these are:

1. The primary data
2. Archival data

3.1.1 Primary data

Questionnaire: A socio – economic survey was performed using structured questionnaire in the selected household for the parasitological study, after the head has signed a consent form the questions will elicit information on family size, composition of house (age, sex) farm size, average annual income per household, type of agricultural system (irrigation or rain fed) live stock ownership and housing condition based on (klinkenberg et al. 2005).

3.1.2 Archival data (Secondary data).

Health care recorded data on malaria from health care centre was collected for the parasitological survey in the irrigated and non irrigated communities, where the records of malaria prevalence, however textbooks journal seminar and conferences papers that are related to this study are also consulted.

3.1.3 RESEARCH DESIGN

The method applied in this study is systematically described. It provides a systematic way of looking at event; collecting data, analyzing information and reporting results. It narrows down a broad field of research into one easily researchable topic. It employed descriptive survey as a design in which the feature or variables being studied for any sample are never compared for various strategy of the sample which in most cases are the dependant variable for the study. And the various methods and strategies to obtain relevant information to provide answers to questions posed and assisted in drawing suitable conclusions after the data had been analysed. A combination of qualitative and quantitative data was gathered for the data analysis.

3.1.4 Sampling Techniques

Stratified sampling techniques were used to segregate the Garun-Mallam Local Government Area based on the agricultural practices. The first stage is the selection of irrigated and non-irrigated area. The method used is the division of the entire local government area into 10

based on the geo-political wards out of which Seven (7) wards were irrigated area while 3 wards practiced rain-fed cultivation. However, systematic random sampling was used in which Garun-Mallam ward and Garun-Babba ward were selected for the irrigated area. While Makwaro was selected as non-irrigated area, the second stage is the taking records of all the settlements in the selected wards out of which Garun-Malam has 24 settlements, Garun Babba 10 settlements while Makwaro has 14 settlements. Then 20% out of each has been taken. Systematic random sampling was used for questionnaire administration in the respective households as it is shown above such as 5 settlements for Garun-Mallam, 2 settlements for Garun-Babba and 3 settlements for Makwaro. Hence, 20% of the total number has been taken by the researcher for the questionnaire administration to the respective household heads.

3.1.5 PROCEDURE FOR DATA COLLECTION

Information was obtained from households about the subject matter. Personal interview with questionnaires which involve the interviewer asking questions and recording the answers given by the household, some household filled the questionnaire themselves. Questionnaires were used to obtain information from 307 households. This method was adopted considering the literacy level of some of the respondents and also for the interviewer to create a rapport to make the respondents confident to provide answers to questions. The questionnaires were designed in such a way that key questions concerning the commonest disease in the area, incidences of malaria, disease assessment of local environmental condition, the most affected gender, age group mostly affected and how it affect productivity, problems encountered by the community, problems caused by the occurrences of malaria were easy to understand and were well answered. Variables such as attitude towards environmental hygiene, availability of dumping sites, responsibility for cleaning the immediate surroundings, how waste is disposed, willing to pay for waste collection, type of sanitary facilities available, their conditions and management, personal measures to prevent filth and promote hygiene in the immediate surroundings, among others were investigated. Demographic information of the study participants, which includes age, sex, place of residence, socio-economic, history of malaria treatment in at least past four weeks and whether or not the participant slept under a mosquito net the night before the survey, was also collected. Records were obtained from health care centres in the study area, data was collected from statistical record departments of the following health institution, viz; comprehensive health centres of Chiromawa, Makwaro, Jobawa, Dorawar-Sallau, Garun Mallam, Garun-Babba, yadakwari, Kadawa, Dakasoye. But there is one ward with no hospital, talk less of available data as in the case of Fankurum. The data was extracted from the case file of all in-patients of those health institutes listed above.

4.0 DATA ANALYSIS

Quantitative technique of analysis was used such as percentages, to compare variation in malaria prevalence between villages; however, to identify household factors associated with malaria prevalence among irrigated and non-irrigated communities using SPSS version 22 software.

4.1 RESULT AND DISCUSSION

Data collected from the individual household heads questionnaire on self-evaluation survey was summarized in form of frequencies and percentages and presented as follows:

SOCIO-DEMOGRAPHIC CHARACTERISTICS

Table 4.0.1 Sex distribution

Sex	Communities/Area	
	Irrigated area ($n_1 = 131$) %	Non-irrigated area ($n_2 = 174$) %
Male	39.0	43.0
Female	61.0	57.0
Total	100.0	100.0

Source: Field work 2014

Table 4.0.1 above indicates that the female occupies the highest percentage of people affected by malaria disease with about 61.0% of the total respondents of female category in the irrigated community, and male has about 39.0% out of the total respondents of irrigated community. It was also revealed that about 57.0% of the total respondents of female in this category and male have about 43.0% out of the total respondents in non – irrigated community.

Table 4.0.2: Age group affected by malaria

Age group	Communities/Area	
	Irrigated area ($n_1 = 129$) %	Non-irrigated area ($n_2 = 174$) %
0-17 years	50.0	70.0
18-44 years	27.0	12.0
45-64 years	4.0	8.0
65 and above years	19.0	10.0
Total	100.0	100.0

Source: Field work 2017/18

Table 4.0.2 above shows the age group affected by malaria in the two communities respondents of age ranges between 0 – 17 years has the highest risk of malaria disease with 70.0% and 50% of the total malaria infected in both the non – irrigated and irrigated community respectively, followed by the respondents of age ranges of 18 – 44 year of the highest risk of malaria disease with about 10.0% and 12% of the total malaria infected in both the non – irrigated and irrigated community respectively.

Table 4.0.3: the most frequently occurring diseases among the communities

Diseases	Communities/Area	
	Irrigated area (n_1 = 127) %	Non-irrigated area (n_2 = 153) %
Malaria	97.0	87.0
Cholera	-	1.0
Typhoid	2.0	10.0
Measles	1.0	2.0
Total	100.0	100.0

Source: Field work 2017/18

Report from table 4.0.3 above indicates that the non-irrigated community occupies the highest percentage of malaria prevalence with about 87.0% of the total respondents of the non – irrigated category, while the irrigated community has occupied about 97.0%. While the remaining respondents were either having cholera, typhoid or measles for the balance of the total number sampled.

Table 4.0.4: Case of malaria per household

Case per hold	Communities/Area	
	Irrigated area (n_1 = 131) %	Non-irrigated area (n_2 = 174) %
Daily	28.0	18.0
Weekly	18.0	14.0
Monthly	44.0	40.0
Yearly	8.0	10.0
Not often	2.0	18.0
Total	100.0	100.0

Source: Field work 2017/18

Table 4.0.4 also shows that the household that have monthly cases has the number of malaria disease with about 40.0% in the non – irrigated community, followed by the household that has daily and not often cases that has about 18.0% of that category, while in the irrigated community, monthly cases have the highest number of malaria disease with about 44.0% in the irrigated community, followed by the household that has daily cases of about 28.0% of that category.

Table 4.0.5: Identification of malaria

	Communities/Area	
	Irrigated area (n_1 = 121) %	Non – Irrigated area (n_2 = 171) %
By mere observation	22.0	46.0
With the help of health worker	73.0	51.0
Others specify	5.0	3.0
Total	100.0	100.0

Source: Field work 2017/18

From the above table (Table 4.0.5) reveals that both the irrigated and non – irrigated communities were of the opinion that most of the respondents identify malaria parasite through the health workers with about 73.0% and 51% respectively, and also the respondents of both the irrigated and non – irrigated communities were of the opinion that the respondents identify malaria parasite through mere observation with about 22.0% and 46% respectively.

Table 4.0.6 Relationship

Relationship	Communities/Area	
	Irrigated area (n_1 = 130) %	Non-irrigated area (n_2 = 174) %
Low	41.0	63.0
High	47.0	26.0
Very high	12.0	11.0
Total	100.0	100.0

Source: Field work 2017/18

From the above table (Table 4.0.6 Factor responsible for the occurrence of malaria disease) reveals that the non – irrigated community were of the opinion that relationship between sanitation and increase of malaria parasite was low with about 63.0% and also the respondents were of the opinion that relationship between sanitation and increase of malaria parasite was high has about 26.0% while the rest of the respondents in this category are of the opinion of very high for remaining balance. While the irrigated community were of the opinion that relationship between sanitation and increase of malaria parasite was low with about 48.0% and also the respondents were of the opinion that relationship between sanitation and increase of malaria parasite was high about 41.0%.

Table 4.0.7 Sanitation and increase in malaria parasite

Sanitation	Communities/Area	
	Irrigated area ($n_1 = 110$) %	Non-irrigated area ($n_2 = 151$) %
Daily sanitation	46.0	59.0
Irrigation area	36.0	1.0
Poor sanitation	18.0	40.0
Total	100.0	100.0

Source: Field work 2017/18

Table 4.0.7 reveals that both the non – irrigated and irrigated community were of the opinion that relationship between sanitation and decrease of malaria parasite was due to daily sanitation with about 59.0% and 46% respectively, also the respondents were of the opinion that relationship between sanitation and increase of malaria parasite was due to poor sanitation about 40.0% while the rest of the respondents in this category are of the opinion of irrigation area for remaining balance of non – irrigated communities. While the respondents with the opinion that relationship between sanitation and increase of malaria parasite was due to irrigation activities with about 36.0%, while the rest of the respondents in this category are of the opinion of poor sanitation for remaining balance of irrigated communities' total.

Table 4.0.8 Refuse dump site

Where do you dump your refuse	Communities/Area	
	Irrigated area ($n_1 = 121$) %	Non-irrigated area ($n_2 = 174$) %
Government dumpsite	12.0	1.0
Private dumpsite	18.0	4.0
Community dumpsite	70.0	95.0
Total	100.0	100.0

Source: Field work 2017/18

The table 4.0.8 reveals that both the non – irrigated and irrigated communities were of the opinion that dumping their refuse in "Community dump site" with about 95.0% and 70% respectively, also the respondents were of the opinion that dumping their refuse in "private dump site" with about 4.0% while the rest of the respondents in this category are of the opinion of dumping their refuse in "government dumpsite for remaining balance of non – irrigated communities. While the irrigated community were of the opinion that dumping their refuse in "private dump site" with about 18.0% while the rest of the respondents in this category are of the opinion of dumping their refuse in "government dumpsite for remaining balance of irrigated communities. In general, private dumpsite is dominant place of refuse collection center in the both communities.

Table 4.0.9: Main causes of malaria

Main cause of malaria	Communities/Area	
	Irrigated area ($n_1 = 128$) %	Non-irrigated area ($n_2 = 172$) %
Over population	12.0	11.0
Congested settlement	13.0	11.0
Poor drainage	10.0	63.0
Illegal dumpsite	13.0	14.0
Agricultural activities	52.0	1.0
Total	100.0	100.0

Source: Field work 2017/18

Table 4.0.9 reveals that the non – irrigated community were of the opinion that the main cause of malaria in this area "poor drainage" with about 63.0% and also the respondents were of the opinion that main cause of malaria in this area in "illegal dump site" with about 14.0% while the rest of the respondents in this category are of the opinion of main cause of malaria in this area "over population, congested settlement and agricultural activities for remaining balance of non – irrigated communities. While the irrigated community were of the opinion that the main cause of malaria in this area "agricultural activities" with about 52.0% and also the respondents were of the opinion that main cause of malaria in this area in "illegal dump site and congested settlement" both with about 13.0% while the rest of the respondents in this category are of the opinion of main cause of malaria in this area over population, and poor drainage for remaining balance of irrigated communities.

5.0 Recommendation

Based on the results of the study the following recommendations are hereby suggested:

i. Construction of latrine facilities and supply of safe water and inculcation of proper behavior in the use of available water facilities through education and public awareness.

ii. To further reduce the incidence of malaria, long lasting insecticides nets (LLINs) made available either at a subsidized price or for free to the communities. Adequate supply of anti -malarial drugs should be included in free health care for children less than five years in order to ensure prophylaxis care for the children.

5.0.1 Conclusion

The residents of irrigated area (Garun-Mallam ward and Garun Babba ward) were more likely to be infected compared to those living in the non-irrigated area of (Makwaro). However, those in the non-irrigated area were more likely to be treated or use over-the-counter medication for perceived malaria illnesses compared to those in the irrigated area. There is a need, therefore, to formulate effective ways of managing malaria especially in irrigated areas and build capacity on differential diagnosis for malaria, especially in the pastoral areas.

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