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Rural Folks' Knowledge on and Adherence towards Artemisinin-based Combination Therapies

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Abstract:
Approximately 3.2 billion people in the world are at risk of malaria. Last year alone, WHO reported about 214 million malaria cases and estimated a malaria death toll of 438,000. In the year 2015, Sub-Saharan Africa alone recorded 89% of the world malaria cases and 91% of the malaria death toll (WHO, 2015). Artemisinin-Based Combination Therapies (ACTs) remain the mainstay of malaria treatment in Ghana. This study therefore, sought to assess the knowledge on and adherence towards ACTs in the Adansi Traditional Area of the Ashanti Region of Ghana. A descriptive cross-sectional survey was carried among 310 adults who had or were taking ACTs and were currently living in the area during the study period. Quota sampling technique was used in selecting a representative number of the participants from each of the 7 towns in the traditional area. Primary data were obtained using self-administered and interviewer-assisted questionnaires. Statistical Package for Social Sciences version 23 guided the analysis of data and data presentation was done using descriptive and inferential statistics.
The study discovered that majority (67.1%) of the respondents had knowledge on first line drugs use for treating malaria. Moreover, there was asignificance (p-value <0.05) association between participants' education, occupation and their knowledge on ACTs. Although, 97% of the participants didn't experience any of ACT's side effect, only half (50%) of them adhered to its frequency and dosage. This therefore calls for intensification of public education on the relevance of adhering to ACTs and medications at large.

Keywords: *Artemisinin combination therapies, knowledge, adherence, fomena, Ghana*

1. Background

According to World Health Organization (WHO) (2015), approximately 3.2 billion (nearly half of the world's population) people in the world are at risk of malaria. Last year alone, WHO reported about 214 million malaria cases and estimated a death toll of 438,000. Since the year 2000, several efforts have been channeled towards prevention of malaria across borders. The emergence and adoption of the United Nations Millennium Development Goals (MDGs) contributed immensely towards the fight against malaria as most governments and heads of state have remained resolute and were devoted to combating HIV/AIDS, Malaria and other diseases, all of which aimed at achieving MDG 6. These commitments increased the prevention and control measures thereby, reducing malaria mortality rates to 60%. Surprisingly, in the year 2015, Sub-Sahara African countries alone recorded 89% of the world malaria cases and 91% of the malaria death toll (WHO, 2015)

Adeneye*et al.* (2013) examined the extent to which home management of malaria (HMM) raised the ability in promptly recognizing and treating malaria at home. Many authors (Oliver et al., 1991; Greenwood 1999; WHO, 2010) posited that the use of ACTs should be encouraged in home management but a caution must be taken in its usage because of misdiagnosis. Moreover, most diagnoses were based on fever as the main indicator. It was known that Artemisinin Combination Therapies' (ACTs') awareness was still low as at 2010 due to lack of efforts from local government agencies.

Ashikeni*et al.* (2013) assessed the knowledge of malaria and practices related to its prevention and treatment among women of Kuje Area Council in Nigeria. The authors found that the knowledge of malaria and its causes to be less about 1.8% among intervention groups prior to the lunch of the main intervention program with knowledge improving after among the group to 90.2% after mouth of the program. Moreover, the authors further posited that the ideas about the measures to curb the incidence of malaria were predominantly low (5.4%) prior to the program. It was further revealed that mothers mostly use Chloroquine in treating their children's malaria. The study concluded that aside parents lack malaria and its prevention; they also refused to use the endorsed ACTs' drug for treating malaria.

Djangmah & Esena in 2013assessed provider training on the use of Amfm Acts in Private Drug Outlets in Kumasi Metropolis of Ghana and the study concluded that chemical outlets use presumptive diagnostic techniques in detecting malaria without using rapid diagnostic tests (RDTs). Also, the researchers found that 84.8% of trained persons are able to correctly diagnose mild malaria compared to 48.5% of untrained persons. Again 92.6% of trained persons were able to clinically identify complex malaria. On the average, ACTs were predominantly prescribed by trained chemists for the management of malaria with others prescribing monotherapies, and Sulfadoxine-Pyrimethamine (SP), but not Chloroquine.

Mannan, *et al.* (2015) sought to describe frontline health care providers' knowledge about the formulations and dose regimens of nationally recommended ACT in Sudan and the study discovered that about 95.7% of chemists who dispense drugs had knowledge on the malaria policy with 87.2% proving that artesunate-sulphadoxine/ pyrimethamine among others are the recommended drug for the treatment of malaria. Few prescribers and dispensers (9.4% and 13.6%, respectively) could not explain the meaning of the combination therapy. In general, the study found that knowledge in the area of ACTs among front liners at health care centers were extremely poor and efforts are needed to reverse the situation.

Ahmed et al. (2009) explored Knowledge on the transmission, prevention and treatment of malaria among two endemic population of Bangladesh and their health-seeking behaviour. The researchers discovered that prevalence of malaria in the 13 endemic districts were 3.1% using the Rapid Diagnostic Test. Education was found to have a positive influence on the awareness of malaria transmission, prevention and treatment with allopathic treatment widely recommended. Surprisingly, about 31% did not seek for medical care whereas 12% engaged in self-medication. Only 40% sought for medical care mostly from drug dispensers and remote doctors.

Laar*et al.* (2013) investigated the Community perception of malaria and its influence on health-seeking behaviour in rural Ghana. Awareness of malaria and conditions suitable for mosquito breeding places to be 65% with 83.3% acquiring their knowledge of malaria from health workers at the Navrongo Health Research Center (NHRC), radio accounted for 7.3%, television was 5.8%, friends were 1.7% and newspapers were 0.8%. it was affirmed that individuals also resulted to the use of traditional means of treating malaria. It was therefore concluded that perceptions about the treatment of malaria is very vital to the complete eradication of the killer disease hence the need to increase sensitization.

Neave & Soares (2015) explored the perceptions and practices undertaken in relation to all aspects of malaria control by members of two rural communities in Timor-Leste. The study found some breeding places for malaria such as rice fields, leaking taps, inadequate water supplies and refuse dumps were noted for the breeding places for mosquitoes. Indigenes were aware of the factors that that promote the breeding of mosquitoes but lacks the mechanisms to control it and to prevent malaria. Distribution of bed net was one measure introduced by the National Malaria Control Programme to combat the incidence of malaria in the area. Nonetheless, limiting the distribution of the nets to only pregnant and children less than 5 years indicates that only those with access will be protected from the malaria parasite. Self-treatment using traditional drugs was declared unsafe for people and suggested that enhancement in infrastructure; empowerment and wide access to preventive measure like nets will go a long way to protect locals from contracting the malaria. Considering the fact that ACTs remain the mainstay in the management of malaria in Ghana, the authors sought to assess the knowledge on and adherence towards ACTs in the Adansi traditional area.

2. Materials and Methods

2.1. Study Design

A descriptive cross-sectional survey design was considered appropriate as the researchers were interested in assessing the participants' knowledge on and adherence towards ACTs.

2.2. Study Area and Population

The study was carried out at Adansi traditional area in the Ashanti region of Ghana. This traditional area comprises of seven major towns namely Dompoase, Ayaasi, Old-Edubiase, Akrokerri, Bodwesango, Old Akrofruom and Fomena, which also doubles as the district capital. The accessible population for the study included adults (aged 18 and above), who had taken or were currently taking ACTs for the treatment of malaria, and were living in the Adansi traditional area as at the time of the study.

2.3. Sample Size and Sampling Technique

Quota sampling technique was used to select 310 participants for the study. Depending on the size of eligible participants in the each of the 7 towns, adults who had or were currently taking ACTs, were picked proportionately to represent each quota.

2.4. Data Collection Instruments

Primary data on participants were collected using self-administered and interviewer-assisted questionnaire as some participants could not read nor write.

2.5. Data Analysis

Data analysis was done using Statistical Package for Social Sciences (SPSS) version 23. The study hypotheses were tested at 95% confidence interval and p value was considered statistically significant at the 0.05 level.

2.6. Ethical Considerations

All eligible participants were informed about the purpose and design of the study, as well as the voluntary nature of participation and withdrawal from the study at any time. They were also assured about confidentiality and anonymity of their responses. Participants who verbally consented further signed a written consent form to serve as evidence for their voluntary participation. Moreover, data collected were available only to the research team and stored in a locked filing cabinet in one of the researcher's office to be kept for at least five years.

3. Results and Discussion

3.1. Socio-Demographic Characteristics of Participants

As illustrated in Table 1, there was an almost equal percentage of males (51%) and females (49%) that participated in this study. Majority (58.7%) of the participants were below age 25, and were also married (58.7%). Apart from a little above a quarter (25.2%) of the participants who had no formal education, the remaining had received some level of formal education up to tertiary level. With respect to occupation, the participants were predominantly engaged in farming (26.5%), trading (25.8%) and other businesses (25.8%). About a third of the participants' household were headed by husbands (32.9%).

Characteristics	**Frequency (%)**
Gender	
Male	158(51.0)
Female	152(49.0)
Age	
Below 25year	182(58.7)
26-35yrs	4(1.3)
36-45yrs	102(32.9)
46-55yrs	12(3.9)
56+	10(3.2)
Marital Status	
Married	182(58.7)
Divorced	4(1.3)
Single	102(32.9)
Living-together	12(3.9)
Widowed	10(3.2)
Highest Level of Education	
Tertiary	42(13.5)
SHS	106(34.2)
JHS	54(17.4)
Primary	24(7.7)
None	78(25.2)
Others, specify	6(1.9)
Occupation	
Farmer	82(26.5)
Trader	80(25.8)
Fisherman/fish monger	4(1.3)
Seamstress	10(3.2)
Government worker	34(11.0)
Hairdresser	20(6.5)
Other, specify	80(25.8)
Household Head	
Husband	102(32.9)
Others, specify	208(67.1)

Table 1: Socio-demographic Characteristics of Participants(n=310)
Source: Field Statistics, 2015

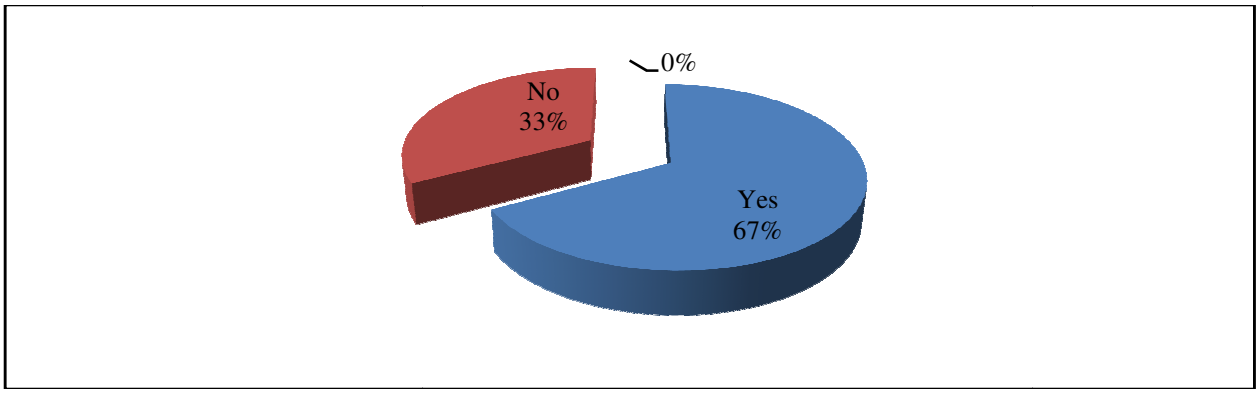

Figure 1: Knowledge about drugs used to treat malaria
Source: Field Statistics, 2015

Majority (67.1%) of the respondents had knowledge on first line drugs used in malaria treatment (refer to Figure 1). This implies that the respondents have received adequate training, orientation and capacity building on malaria. These could also be attributed to the fact that government and other non-governmental organizations have intensified education, awareness, and prevention behaviours on malaria geared towards attaining the MDGs. This finding corroborate with Laar et al. (2013) who investigated the Community perception of malaria and its influence on health-seeking behaviour in rural Ghana. Awareness of malaria and conditions suitable for mosquito breeding places to be 65% with 83.3% acquiring their knowledge of malaria from health workers at the Navrongo Health Research Center (NHRC), radio accounted for 7.3%, television was 5.8%, friends were 1.7% and newspapers were 0.8%. Moreover, Yerpude (2013) conducted a related study among Households in an Urban Slum Area of South India and found that 91.5% of the study population was knowledgeable about places where mosquitoes bread with 22.29% believing that mosquito's bread at refuse dumping areas.

Variables	Knowledge on ACTs Drugs		p-value	df	Remarks
	Yes	No			
Gender					
Male	108	50	0.631	1	Not significant
Female	100	52			
Age					
Below 25years	122	60	0.699	4	Not significant
26-35yrs	4	-			
36-45yrs	68	34			
46-55yrs	8	4			
56+	6	4			
Marital status					
Married	122	60	0.699	4	Not significant
Divorced	4	-			
Single	68	34			
Living-together	8	4			
Widowed	6	4			
Highest level of education					
Tertiary	16	26	0.000	5	Significant
SHS	66	40			
JHS	36	18			
Primary	20	4			
None	66	12			
Other, specify	4	2			
Occupation					
Farmer	66	16	0.000	6	Significant
Trader	50	30			
Fishing/fish mongering	4	-			
Seamstress	4	6			
Government	16	18			
Hairdresser	18	2			
Other, specify	50	30			

Table 2: Association between Socio-demography and Knowledge on ACTs
Source: Field Statistics, 2015

From the table 2 the survey results revealed that the association between educational level and knowledge on ACTs drugs is significant (p-value <0.05) at 95% confidence interval. This implies that as more people receive formal education their knowledge on contemporary issues increase. These issues include those that affect their health and lifestyle such as malaria infection and prevention. These results support the work of Ahmed et al. (2009) who reported that education was found to have a positive influence on the awareness of malaria transmission, prevention and treatment with allopathic treatment widely recommended. Again, these results support the study of Djangmah & Esena, (2013) who conducted similar study in Ghana and reported that about 84.8% of trained persons are able to correctly diagnose mild malaria compared to 48.5% of untrained persons.

In the present study, there was a statistically significant (p-value = 0.000 < 0.05) association between participants' occupation and their knowledge on ACTs at 95% confidence interval. The implication of this finding is that the professions of people influence their knowledge on many issues. Regarding occupation/profession and knowledge on ACTs, several associations had been established. For instance Mannan et al. (2015) sought to describe frontline health care providers' knowledge about the formulations and dose regimens of nationally recommended ACT in Sudan and the study discovered that about 95.7% of chemists who dispense drugs has knowledge about the malaria policy with 87.2% proving that artesunate-sulphadoxine/ pyrimethamine among others are the recommended drug for the treatment of malaria.

The association between participants' knowledge on ACTs and their gender(p-value = 0.631 > 0.05), age (p-value = 0.699 > 0.05) and marital status (p-value = 0.699 > 0.05) were all statistically insignificant at 95% confidence interval.

Variables	Knowledge on ACTs effectiveness		p-value	df	Remarks
	Yes	No			
Gender					
Male	150	8	0.062	1	Notsignificant
Female	150	2			
Age					
Below 25years	176	6	0.906	4	Not significant
26-35yrs	4	-			
36-45yrs	98	4			
46-55yrs	12	-			
56+	10	-			
Marital status					
Married	176	6	0.906	4	Not significant
Divorced	4	-			
Single	98	4			
Living-together	12	-			
Widowed	10	-			
Highest level of education					
Tertiary	42	-	0.632	5	Not significant
SHS	102	4			
JHS	52	2			
Primary	24	0			
None	74	4			
Others, specify	6	-			
Occupation					
Farmer	78	4	0.019	6	Significant
Trader	76	4			
Fishing/fish mongering	4	-			
Seamstress	8	2			
Government	34	-			
Hairdresser	20	-			
Other, specify	80	-			

Table 3: Association between Socio-demography and Knowledge on ACT's effectiveness
Source: Field Statistics, 2015

As depicted in Table 3, there was a statistically significant association between participants' knowledge on ACT's effectiveness and their occupation (p-value = 0.019 < 0.05) at 95% confidence interval. This result support the findings of Mannan et al. (2015) who sought to describe frontline health care providers' knowledge about the formulations and dose regimens of nationally recommended ACT in Sudan. Their study discovered that about 95.7% of chemists who dispense drugs had knowledge about the malaria policy with 87.2% proving that artesunate-sulphadoxine/ pyrimethamine among others were the recommended drug for the treatment of malaria. Again, those whose professions are closely related to health and environment including government workers are most likely to know more on ACTs effectiveness. Moreover, farmers who belong to associations are most likely to have adequate knowledge on the effectiveness of ACTs.

On the contrary, all the other socio-demographic variables had no statistically significant association with participant's knowledge on ACT's effectiveness. For instance, the association between participants' knowledge on ACTs effectiveness and their gender(p-value = 0.062 <. 05), age(p-value = 0.906> .05), marital status (p-value = 0.906 > 0.05), educational level (p-value = 0.632 > 0.05) were all statistically insignificant at 95% confidence interval.

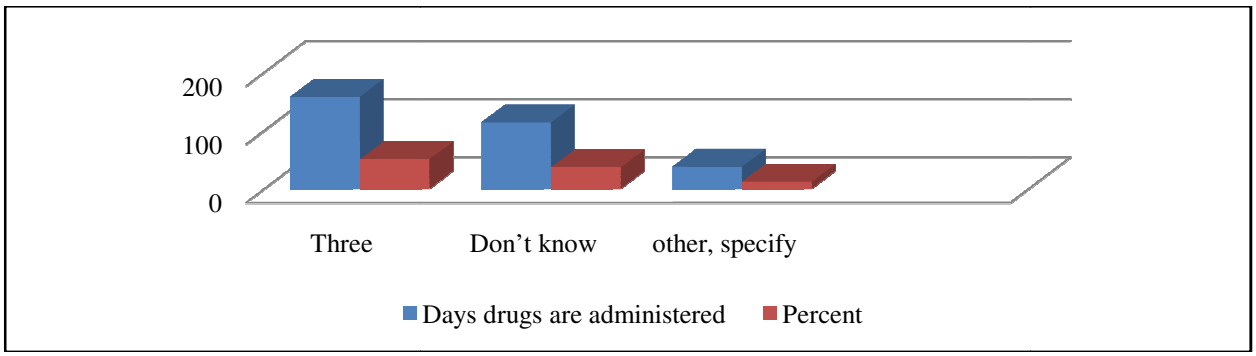

Figure 2: Days drugs are administered
Source: Field Statistics, 2015

Regarding adherence to daily medication, the study revealed that majority of the respondents did not adhere to the daily dosage of ACTs. This can be attributed to the fact that about a quarter of participants did not have any form of formal education. Moreover, some respondents have low level of formal education required to adequately comprehend ACTs medications. It is suggested that through public education and media blitz this challenge can be prevented.

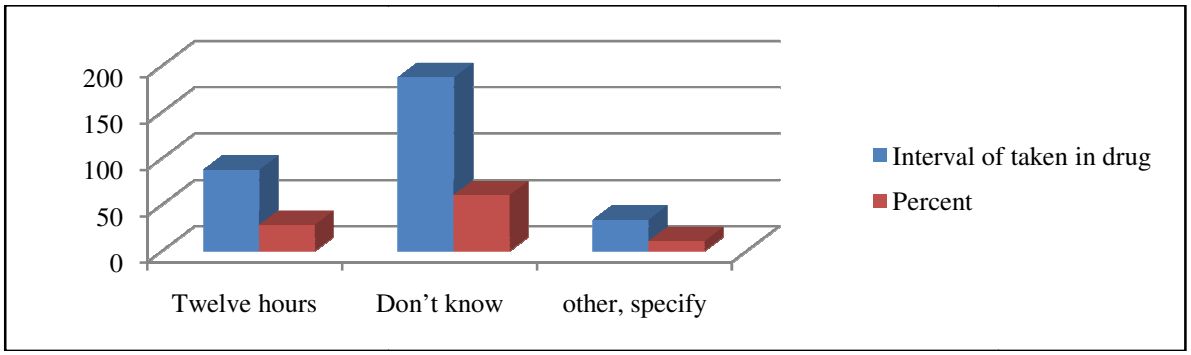

Figure 3: Interval drug is supposes to be taken
Source: Field Statistics, 2015

About 28.5% of the respondents admitted to be taking their drugs at twelve-hourly intervals, 11% mentioned other unspecified time, and majority (60.6%)did not know the time interval for taking the ACTs. This result suggests that adherence to medication frequency is a challenge so far as this study is concerned as majority did not have adequate idea on the exact interval for taking medication. This can be attributed to the fact that about a quarter of the participants had no formal education and majority also had lower level of education and thus, might have resulted in these non-adherent behaviours. Educational strategies that appeal to illiterates and people with low educational status should be used in educating the public on the relevance of adherence to ACTs so as to improve outcomes.

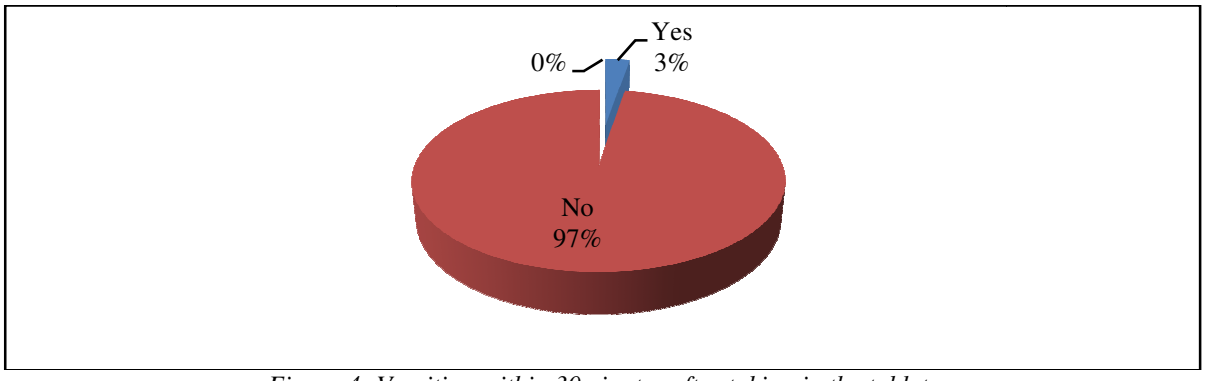

Figure 4: Vomiting within 30minutes after taking in the tablets
Source: Field Statistics, 2015

Whilst the vast majority (97%) of participants stated that, they didn't vomit after takingACTs, only 3% vomited within 30 minutes after taking the medications. This result indicates that there is no obviously major vomiting side effect of ACTs as indicated by majority of the participants in this study.

4. Conclusions

Majority of the participants had knowledge about the use of ACTs in treating malaria and their effectiveness. While knowledge on ACTs was strongly associated with participants' educational level and their occupation, knowledge on ACTs' effectiveness was also strongly associated with occupation. Although 97% of participants indicated that they did not experience vomiting as a side effect of ACTs, only half of them adhered to the frequency and dosage of ACTs. This therefore calls for intensification of education on the relevance of adhering to ACTs and medications in general.

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