

Determinants of malaria treatment seeking behaviour among urban and rural households in North Central Nigeria

Abstract

Background: Malaria is a major cause of morbidity and mortality in Nigeria accounting for a significant proportion of household expenditure in treatment and prophylaxis. Nigeria account for 25% of global clinical cases and mortality and also has the highest malaria burden in sub Saharan Africa. In most cases of malaria illness, treatment takes place at the community level and only few serious cases are taken to healthcare facilities. A number of cultural, socioeconomic, patient related and health service provider variables often in a complex interplay are known to influence treatment seeking behaviour, though the relative importance of variables differ widely between settings.

Objectives: To identify where households receive malaria treatment services as well as prevalence of malaria related hospitalization. Also to identify the most common factor(s) that most influence malaria treatment behaviour.

Methods: This is a cross section study using multistage sampling method for household survey. The study was carried out during the rainy months of June and July 2016. Six towns with high urban and rural population density in Benue State were purposely selected for survey. A total of 1705 completed household administered questionnaires were found usable for analysis. The data was entered into SPSS version 20 for descriptive and inferential analysis. Factor analysis using principal component analysis, varimax rotation with KMO normalization was carried out. Factor loadings lower than 0.4 was suppressed. Mean item scores with high factor loading and mean total extracted component score were used for further analysis. P values ≤ 0.05 was considered significant.

Ethical issues: Ethical approval was sought and obtained from health research ethic department of Benue State Ministry of health and human services (Ref.no.MED/261/VOL./540).

27 **Results/Discussion:** The average malaria prevalence in rural areas was twice that of urban areas,
28 though the rates of hospitalization were similar. About 50% of households in both rural and urban
29 areas reported at least one episode of malaria within the study period reflecting persistence of high
30 malaria transmission. Many variables have been shown to influence treatment behaviour.

31 **Conclusion:** Malaria cases and malaria related hospitalization remain high and while public health
32 facilities play more dominant roles, while in rural areas private providers dominates the landscape.
33 Treatment seeking behaviour is largely influenced by many variables relating to availability,
34 accessibility, affordability and perceptions of household healthcare decision makers.

35 **Keywords:** Malaria, Treatment behaviour, Determinants, Household

36 **Title: Determinants of malaria treatment seeking behavior among urban and rural households**
37 **in north central Nigeria.**

38 **Background:** "Malaria" is a major cause of morbidity and mortality in Nigeria particularly in pregnant
39 women and children below five years [1] The disease is estimated to be directly responsible for 20 –
40 40% of global hospital out-patient consultations in malaria endemic countries. In sub Saharan Africa
41 malaria is estimated to be responsible for 10 – 15% of hospitalizations primarily due to complications
42 [2]. Globally, prevalence of malaria among populations at risk declined by 21%, mortality also fell by
43 29 among all age groups and for children below five years the decline was about 35% [3]. Nigeria
44 being the most populous country in sub Saharan Africa is expected to contribute to most of the 76%
45 malaria prevalence and 75% of global mortality. The average national prevalence of malaria was
46 45.1% though the number of cases in rural areas more than doubles that in urban areas[4].According
47 to federal ministry of health an estimated 60% of all outpatient hospital visits, 36% of all hospital
48 admissions and 11% of maternal mortality in Nigeria is due to malaria. Over 110 million cases of
49 clinical malaria is diagnosed annually in Nigeria, though there have been concerns about over
50 diagnosis [5]. Malaria is estimated to cause an annual economic loss of about \$132 billion in
51 treatment, prevention and loss of productivity [6].

52 A nationwide malaria indicator survey reported that prevalence was between 24 – 58% across the
53 country [4], however several studies reported much higher prevalence of malaria [7] reported
54 prevalence of 70.8%, [8] (73.9%) and [9] (81.9%). The national malaria treatment policy recognized
55 several shortcomings in malaria management practices when it noted that 80% of malaria is poorly

56 managed at the community level, laboratory confirmation is low and up to 40% of patients with malaria
57 die for lack of proper care.

58 Despite many interventions in the last decade malaria remains a major public health problem. The
59 participation of community and households in detection and treatment of malaria has been vigorously
60 emphasized in most malaria control programmes. The behaviour of households and other care givers
61 in the community to febrile illness has been noted to be an important factor in prevention of
62 complications and reductions in mortality. While the concept of treatment seeking behavior is
63 complex, multifaceted and multidimensional; behavioural model proposed by [10] has been widely
64 used in literature. A number of other models have been proposed to explain treatment seeking
65 behaviour, however many variables of the models frequently overlap, thus producing inconsistent
66 results with wide variations between settings [11].

67 The generally held belief that patients are passive participants in healthcare decisions has been
68 challenged by the work of [12] in which he noted that, though patients cannot influence treatment or
69 less likely to challenge it, they exercise considerable power is choice of where and how to access
70 healthcare services. There is often a complex interplay between patient related and provider variables
71 [13] and determinants may vary due to language problems [14], long travel times [15], ease of
72 transportation [16], waiting time at healthcare facility [17] and quality of care provided [18].

73 In a systematic review [19] concluded that low cost of services, proximity, confidence in treatment
74 methods and positive attitude of healthcare personnel are strong predictors of behaviour. Other
75 determinants of treatment seeking behaviour reported include friendliness of staff [20], cultural factors
76 [21], family size [22] and educational status [23].

Comment [C2]: "A systematic review concluded?...."

Comment [C3]: "included?"....

77 The complexity of determinants of malaria treatment seeking behaviour and wide variability in results
78 is a source of much debate. However continuous evaluation of determinants in different settings is
79 critical to developing appropriate strategies to effectively reach communities,households and decision
80 makers with information that will inform malaria control policy implementation efforts.

81 Objectives

- 82 ▪ To identify the most common factors that influence malaria treatment behaviour
- 83 ▪ To determine malaria prevalence and malaria related hospitalizations.

- 84 ▪ To determine where households access malaria treatment services.

85 **Methods**

Comment [C4]: WHAT IS THE DEFINITION OF A MALARIA EPISODE??

86 **Setting:** This study was carried out in Benue State north central Nigeria. The State comprises 23
87 local government areas and is populated by many ethnic groups with diverse cultures. The major
88 languages spoken in the State are Tiv, Idoma and Iggede and agriculture is the major occupation of the
89 people. The State capital Makurdi is about 270 km south east of Abuja the federal capital.

Comment [C5]: North Central?

90 **Study design:** This was a cross sectional survey of selected households across the State. The study
91 was carried out during the rainy season June and July 2015.

92 **Selection of survey areas:** The selection of survey areas was by multistage sampling method. In the
93 first stage three major towns (Makurdi, Gboko and Otukpo) and three rural areas (Oju, Aliade and
94 Yandev) were purposely selected across the state such that major ethnic groups were represented. In
95 stage two, four major residential districts were randomly selected using information from State town
96 planning department. Stage three involved random selection of four streets in each selected
97 residential district. All houses in the selected streets were numbered serially and every other
98 household was surveyed.

Comment [C6]: "Survey areas were selected by....?"

99 **Data collectors:** Data collectors included pharmacists and nurses were recruited from among staff of
100 private and public healthcare facilities the State. One of the data collectors understand and can speak
101 fluently at least one local language in the assigned survey area. Three day field training on all aspects
102 of data collection was carried out after which data simulation collection exercise was conducted in a
103 few selected households

Comment [C7]: "Data collectors included pharmacists and nurses recruited among the staff of private and public healthcare State facilities?"

Comment [C8]: "At least one individual in the data collection team was fluent in the local language spoken in a particular area?:::"

Comment [C9]: "A three day....?"

104 **Sample size:** The sample size of 1639 was determined using the formula

105
$$N = 4PQ/l^2$$

106 Where

107 N = sample size

108 P = Prevalence (49.4%)

109 Q = 1 – P

110 l² = Permissible error of P (5%)

111 **Questionnaire design:** The questionnaire was a seventeen item five point Likert scale instrument and
112 was administered in randomly selected households in Makurdi. The Cronbach alpha was 0.822 which
113 is an indication of high internal consistency of the instrument. The questionnaires used for pre-testing
114 the instrument were not included in the final data analysis.

115 **Informed consent:** Prior to data collection, informed consent was obtained by agreeing to participate
116 in the survey.

117 **Questionnaire administration:** Two thousand questionnaires were distributed between urban and
118 rural areas in the ratio of 2:1. Houses previously marked for survey were visited by a pair of data
119 collectors and one identified healthcare giver was given the questionnaire after informed consent
120 have been obtained. Those who have difficulties reading or writing were assisted by data collectors
121 either to interpret or enter the response of respondents. Where respondents in pre-selected houses
122 declined participation, an extra household in the same area was surveyed as replacement.

123 **Data analysis:** A total of 1705 questionnaires were found suitable for analysis giving a retrieval rate
124 of 85.2%. The data were collated, checked for errors and entered into Microsoft excel
125 and subsequently loaded into SPSS version 20 for descriptive and inferential analysis. Factor analysis
126 using principal component analysis and varimax rotation with KMO normalization was performed.
127 Factor loading less than 0.4 was suppressed. Mean item score and total mean score for extracted
128 components with high factor loading were extracted and used for further analysis.

Comment [C10]: Was the purpose of the study clearly explained to participants? Was it explained as a group or individually? Was the informed consent in the written or the oral form? Was any penalty applied to those who refused to participate? Was the participation of free will in nature?

Comment [C11]: I do not see an Ethics Committee approval of the study....

Comment [C12]: In some parts of the Discussion (Lines 299-300, 301, 306, 308, 309-310, 320-324, 354-365, etc.) emphasis is given to urban vrs. rural households; however, those data are not clearly presented. A Table would be welcome presenting total of urban and total rural population in each of the areas studied.

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Result/Discussion

Demographic data

Table 1

Variable	Number	Percentage	P value
Gender			
Male	847	49.8	0.002
Female	853	50.2	
Marital Status			
Married	823	48.3	0.128
Single	723	42.5	
Others	156	9.2	
Occupation			
Civil servant	641	37.6	0.035
Self-employed	583	34.2	
Farming	147	8.6	
Others	334	19.6	
Education status			
Primary	172	10.1	0.194
Secondary	396	23.2	
Tertiary	1137	66.7	

Comment [C13]: I do not see any Results description. Kindly **describe** results.

Comment [C14]: Total in this column is 1700.

Comment [C15]: Total in this column is 1702

166 **Household characteristics**

167 Table 2

168		Urban	Rural	P value
169	Mean age of respondents (yrs.)	42.8±12.9	40.4±9.2	< 0.001
170	Household size (n)	5.5±2.9	4.7±2.8	0.001
171	Distance to healthcare facility (km)	7.7±5.5	9.5±5.3	0.022
172	Antimalarial drugcost (\$)	2.41±1.56	2.34±1.28	0.139
173	Other drugs (\$)	2.31±2.08	2.64±1.35	0.016
174	Consultation	2.54±1.48	2.42±1.26	0.161
175	Laboratory test	2.79±1.48	2.91±1.24	0.138
176	Monthly income	135.6±2.99	121.3±87.5	<0.001
177	Average number of malaria episodes/family	1.5	2.6	
178	Average number of hospitalization/family	2.3	2.2	

Comment [C16]: Nowhere are participants presented by age groups.

Comment [C17]: To whom? In general? To the individual? To the Ministry of Health? To the State?

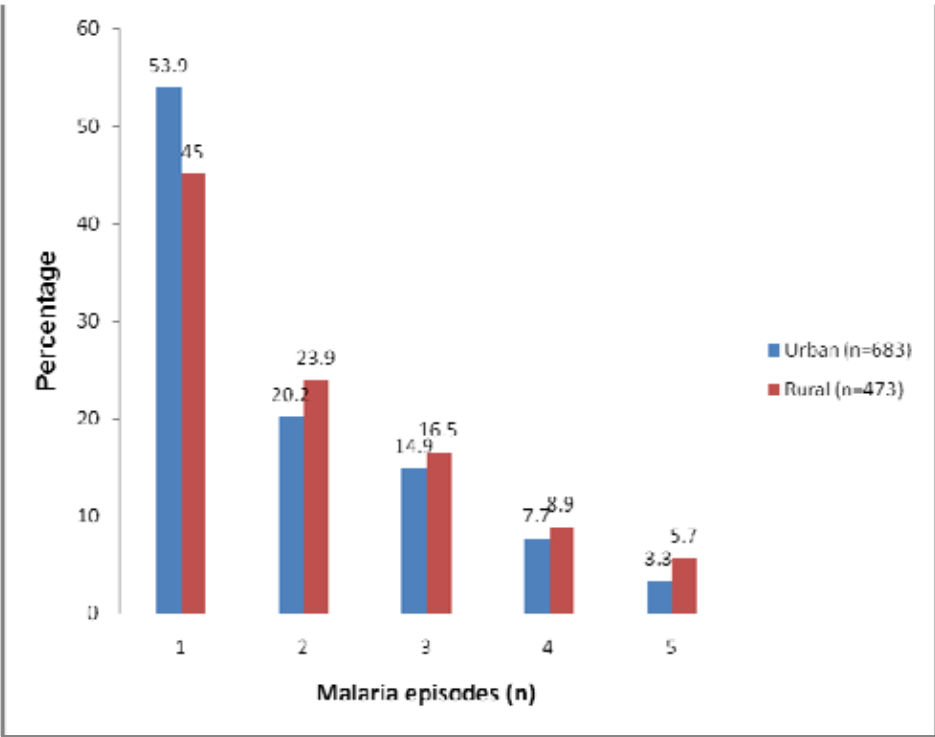
Comment [C18]: Does this mean cost for consultation or number of consultations?

Comment [C19]: What is this? Cost? Number of tests performed?

Comment [C20]: In local currency? Equivalent In US\$? In euros?

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Household reported episodes of malaria in one month



Comment [C21]: HOW WERE THESE EPISODES IDENTIFIED??

Comment [C22]: Where? Among all participants? In a specific group? Title has to be clear and complete, so as to fully understand each Figure.

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Figure 1

Comment [C23]: Was age considered as a variable? Were the participants divided by age groups? Since children migrated to urban areas, are the malaria episodes mainly in children? (Lines 299-300). In adults? In general?

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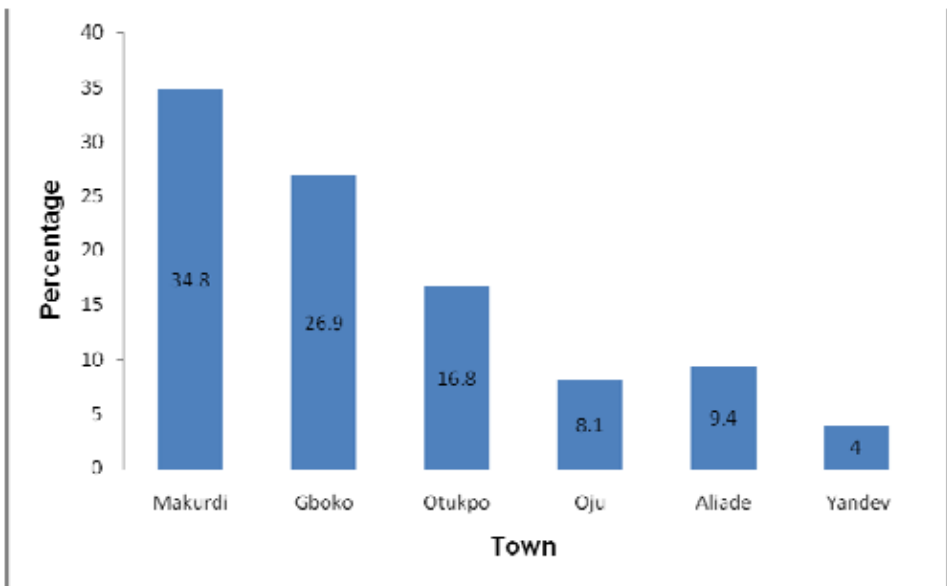
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Household reported malaria cases per town

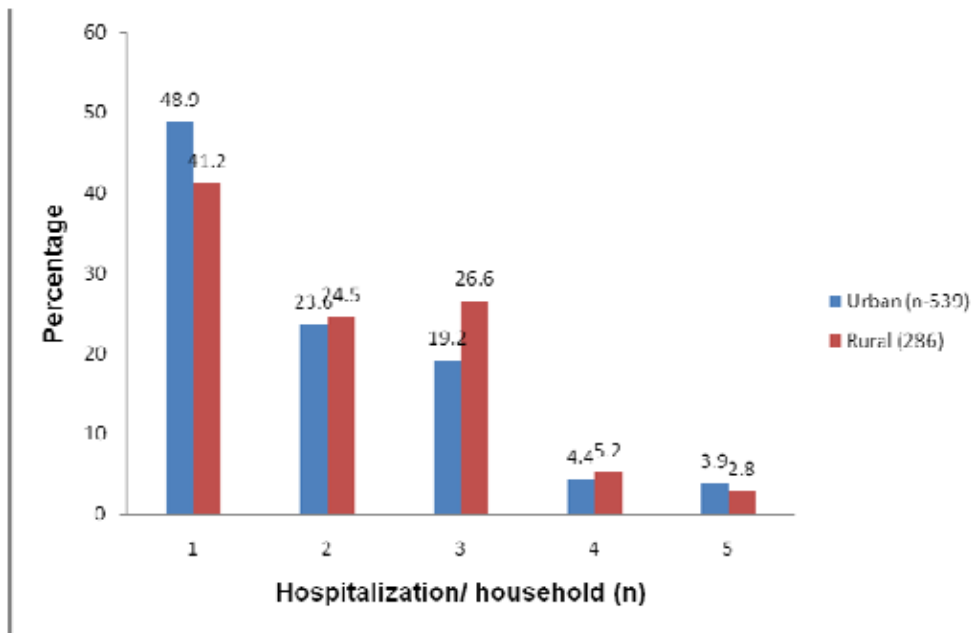


Comment [C24]: According to lines 309-311, one should see here differences between educated and noneducated individuals in relation to malaria knowledge???

Comment [C25]: How many households per town? Which towns are rural? Which towns are urban?

Figure 2

Household malaria related hospitalization in one month

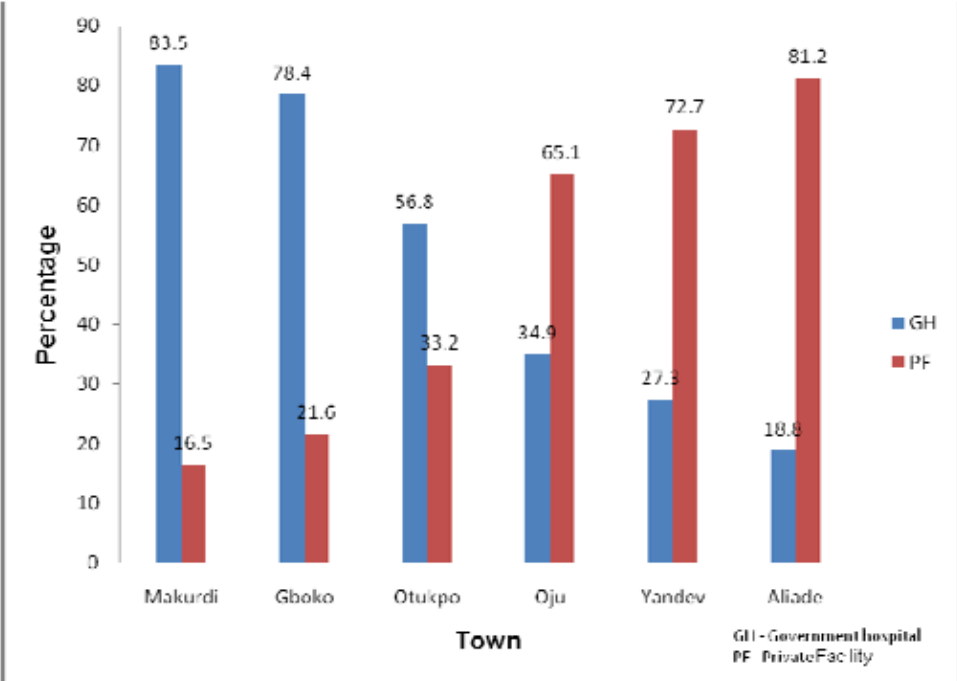


Comment [C26]: Hospitalization despite antimalaria treatment? No previous treatment administration?

Figure 3

Comment [C27]: How does this Figure relate to Figure 2?

245 Source of antimalarial medications



246 Figure 4

263	Distribution of components and mean scores (n=1705)		
264	Table 3		
265	Items	Factor loading	Mean score + SD
266	Component 1 Availability		
267	Laboratory services available	0.704	2.27±1.24
268	Staffs are courteous and friendly	0.798	2.20±1.25
269	Personnel are experienced	0.756	2.10±1.25
270	Services are of high quality	0.610	2.20±1.25
271		Subtotal mean score	2.19±1.25
272	Component 2 Accessibility		
273	Waiting time is acceptable	0.689	2.44±1.30
274	Working hours is convenient	0.714	2.42±1.34
275	Familiarity with facility/staff	0.730	2.72±1.31
276		Subtotal mean score	2.53±1.32
277	Component 3 Affordability		
278	Private or public ownership	0.693	2.67±1.32
279	Cost of services	0.532	2.59±1.27
280	Transport cost to facility	0.609	2.58±1.23
281	Prior cost experience with facility	0.568	2.53±1.35
282		Subtotal mean score	2.59±1.29
283	Component 4 Perception		
284	Presence of co-morbidities	0.713	2.23±1.06
285	Overall health status	0.722	2.26±1.08
286	Influence of family/friends	0.719	2.46±1.28
287	Severity of malaria attack	0.722	2.60±1.30
288	Closeness of facility to my residence	0.533	2.50±1.29
289	Facility is clean and looks attractive	0.543	2.20±1.23
290		Subtotal mean score	2.37±1.21
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295 **Discussion**

296 Demographic data of respondents indicated that females were more than males accounting for 50.3%
297 as against 49.7% for males. Majority of respondents were married and most are either civil servants
298 or unemployed (Table1). The average number of persons per household in urban areas is higher than
299 in rural area and the difference is significant. This is largely because of rural urban migration
300 particularly of children living with relatives in the urban areas. Other differences between urban and
301 rural areas exist in distance to healthcare facilities; the distance is longer in rural areas, mean age of
302 respondents and monthly income (Table2). Respondents in urban areas reported cases of malaria
303 more than twice as frequently as those in the rural areas overall. Households in both urban and rural
304 areas that reported at least one malaria episode were more than double the number of families that
305 reported more than one malaria case within the study period (figure 1). While significant percentage of
306 respondents across the survey areas reported at least one malaria episode the rate is higher in urban
307 areas. This may be due to the fact that detection of malaria symptoms, treatment and preventive
308 behavior is considered to be much better among the urban educated elite compared to rural dwellers.
309 Analysis of data clearly indicated that about a third of urban dwellers and a tenth of rural dwellers
310 reported malaria episodes indicating clear differences in knowledge and response to episodes of
311 malaria (Figure 2). Lack of appropriate knowledge and treatment practices often cause most rural
312 dwellers to mistake malaria for other common local ailments, which makes them either ignore early
313 symptoms of malaria.

314 Overall malaria related hospitalization is much higher in urban areas accounting for as much as half of
315 all malaria related consultations. Also households with more than one case of malaria related
316 hospitalization occurred in urban areas (Figure 3). This result is similar of [24] and [25]; although they
317 noted that the rate of hospitalization is higher during the wet season and decreases with increasing
318 age. Malaria related hospitalization found in this study is lower than 60% reported by [26].

319 Most households in urban areas obtained their antimalarial medications from government hospitals
320 accounting for an overwhelming percentage of respondents (figure 4). However in rural areas profit
321 oriented private healthcare facilities are the major source of malaria medications for the greater
322 percentage of respondents. This trend is reflective of the availability of government healthcare
323 facilities which are dominant in urban areas as against privately owned facilities widely found in every
324 nook and cranny of rural landscape.

Comment [C28]: WAS MALARIA CASE
LABORATORY CONFIRMED?

Comment [C29]: What is the description of
malaria episode? Is it the same as malaria case?

Comment [C30]: Was this compared and proved
in this study? It would be important to have a Figure
comparing malaria episodes between the educated
versus the noneducated.

Comment [C31]: As commented before (No.
22), I fail to see the above in Figure 2....

325 Malaria treatment seeking behaviour is complex and multifaceted and the relative strength of
326 determinants is again dependent on other variables. The findings of this study reveal that there are
327 four components including availability, accessibility, affordability and perceptions of patients are the
328 major determinants of malaria treatment seeking behaviour (Table 3). The high factor loading and
329 mean item scores on a five point Likert scale (strongly agree to strongly disagree) all indicate that
330 these variables influence treatment seeking behaviour. The response to variables represent the
331 opinion of respondents with the mean score providing a measure of how strongly there is agreement
332 or otherwise. Mean scores less than 3.0 imply strong influence on malaria treatment seeking
333 behaviour. These determinants explained by associated variables have earlier been reported by [27]
334 and [28]. In many parts of Benue State, government healthcare facilities in rural areas are few and far
335 in between, healthcare personnel are few, poorly trained and accessibility is limited. This leaves profit
336 - oriented private healthcare facilities to dominate the rural areas, this has obvious negative
337 consequences for financial accessibility.

338 Perception is among the variables that strongly influence malaria treatment seeking behaviour in this
339 study. This was earlier reported by [29], they also noted that provision of laboratory services was
340 perceived to be an important determinant of choice of providers. Other studies [30] also concluded that
341 perception of experience of healthcare personnel in the facility was a strong determinant. While
342 perception and its relative importance in treatment behaviour may vary widely within and between
343 patients of different socioeconomic status, it is recognized that positive perception is a strong indicator
344 of future use of the healthcare facility. Perception of malaria severity and presence of co-morbidities
345 has been noted as an influencer of treatment seeking behaviour. Many households often practice
346 home management first and only when that either fail, or they perceive that the symptoms are severe,
347 do they refer to a healthcare facility for management. Studies by [31] and [32] all noted that
348 perception of health status, severity of symptoms and presence of other diseases determines
349 treatment seeking behaviour of patients. Other studies by [33] and [34] similarly included perception
350 of proximity to facility and waiting times as influencers of treatment behaviour.

351 Affordability of malaria treatment costs was found in this study to be a predictor of treatment seeking
352 behaviour among households (Table 3). The costs associated with malaria treatment such as
353 transportation to point of care, laboratory tests, consultations, drugs etc. are entirely borne by

354 households. The results of this study showed that malaria treatment costs range between US\$3.9 -
355 \$9.8 depending on whether the facility is public or it's privately owned. There are no significant
356 differences between direct cost of malaria medications and laboratory test between urban and rural
357 areas. The cost of treatment in public facilities is comparable to US\$3.52 reported by [35]; although
358 US\$12.46 reported as malaria treatment cost in private facilities was higher than that found in this
359 study. When treatment cost is considered against the \$1.9 daily wage of the least paid unskilled
360 government employee, malaria treatment remains unaffordable to majority of households. This
361 expectedly will have a huge impact on treatment behaviour. Most households in the urban areas
362 largely patronize public facilities where costs are comparatively cheaper, except in areas where options
363 are limited (Figure 4). A combination of lower costs and ease of access in urban areas encouraged
364 the higher patronage of public facilities observed in this study; however in rural areas patronage is
365 driven by costs, availability of facilities and ease of access among others.

Comment [C32]: One US\$ equivalent to what in local currency?

366 Accessibility was found in this study to influence of treatment seeking behaviour. This finding
367 was earlier reported by [34] and later confirmed by [36], [37] and [38]. Generally public hospitals
368 provide round the clock healthcare services as well as a few well-funded private facilities, however
369 waiting times are considered long in public facilities. While the economically well off may choose
370 private facilities where they receive immediate attention, the waiting times in public hospitals can be a
371 significant source of patient dissatisfaction.

372 **Conclusion:** "Malaria" incidence remains high across the State with household reports of incidence
373 higher than national average. Malaria treatment behaviour is strongly influenced by availability of
374 healthcare facilities, ease of access, cost of malaria treatment services as well as perceptions of their
375 experience with healthcare services. Majority of households in the urban areas access malaria
376 treatment services in public health facilities as against privately owned ones in rural areas.

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Comment [C33]: Parasitol....

Comment [C34]: Cost Eff Resour Alloc
(JournalAbbr.com)

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Comment [C37]: Correct abbreviation and
capital letters?

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Comment [C40]: Capital letters??

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