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## Socio-economic differences and health seeking behaviour for the diagnosis and treatment of malaria: a case study of four local government areas operating the Bamako initiative programme in south-east Nigeria

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### Abstract

**Background:** Malaria is one of the leading causes of mortality and morbidity in Nigeria. It is not known how user fees introduced under the Bamako Initiative (BI) system affect healthcare seeking among different socio-economic groups in Nigeria for diagnosis and treatment of malaria. Reliable information is needed to initiate new policy thrusts to protect the poor from the adverse effect of user fees.

**Methods:** Structured questionnaires were used to collect information from 1594 female household primary care givers or household head on their socio-economic and demographic status and use of malaria diagnosis and treatment services. Principal components analysis was used to create a socio-economic status index which was decomposed into quartiles and chi-square for trends was used to calculate for any statistical difference.

**Results:** The study showed that self diagnosis was the commonest form of diagnosis by the respondents. This was followed by diagnosis through laboratory tests, community health workers, family members and traditional healers. The initial choice of care for malaria was a visit to the patent medicine dealers for most respondents. This was followed by visit to the government hospitals, the BI health centres, traditional medicine healers, private clinics, community health workers and does nothing at home. Furthermore, the private health facilities were the initial choice of treatment for the majority with a decline among those choosing them as a second source of care and an increase in the utilization of public health facilities as a second choice of care. Self diagnosis was practiced more by the poorer households while the least poor used the patent medicine dealers and community health workers less often for diagnosis of malaria. The least poor groups had a higher probability of seeking treatment at the BI health centres (creating equity problem in BI), hospitals, and private clinics and in using laboratory procedures. The least poor also used the patent medicine dealers and community health workers less often for the treatment of malaria. The richer households complained more about poor staff attitude and lack of drugs as their reasons for not attending the BI health centres. The factors that encourage people to use services in BI health

centres were availability of good services, proximity of the centres to the homes and polite health workers.

**Conclusions:** Factors deterring people from using BI centres should be eliminated. The use of laboratory services for the diagnosis of malaria by the poor should be encouraged through appropriate information, education and communication which at the long run will be more cost effective and cost saving for them while devising means of reducing the equity gap created. This could be done by granting a properly worked out and implemented fee exemptions to the poor or completely abolishing user fees for the diagnosis and treatment of malaria in BI health centres.

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## Background

Tropical endemic diseases comprise the number one public health problem in Nigeria [1]. They are diseases of poverty because it is the poor and the underprivileged that are most at risk and who because of precarious living conditions and often inadequate health services experience the greatest morbidity. However, malaria is the major cause of mortality and morbidity in Nigeria, and particularly affects children under 5 years [2]. Over 300,000 people mainly pregnant women and children die of the disease each year [3]. Also the economic burden of malaria illness on households is quite considerable and accounts for almost 50% of total economic burden of illnesses in malaria holo-endemic communities [4]. Other endemic tropical diseases like Tuberculosis, Leprosy, Guinea worm, Onchocerciasis, Diarrhoea diseases Pneumonia and HIV/AIDS have their own effect on both the disease and economic burden of illnesses. The control of these diseases is delivered mostly through the Primary Health Care (PHC) system, which forms the bedrock of Nigeria's health Policy [1]. And this is through the treatment and reduction of morbidity and mortality through early diagnosis with prompt and effective treatment and prevention of cases in these facilities on a user-fee basis.

The Bamako Initiative program (BI) which was introduced by the African Ministers of Health meeting in Bamako Mali in 1987 and endorsed by the Nigerian government in 1988 sought to accelerate and strengthen the implementation of primary health care (PHC) services in countries with poor healthcare structures by making people pay for services in form of user fees. It was assumed that the revenue generated will improve health services by improving drug availability with the goal of improving quality of service, extend coverage and ensure equity in access to care including malaria diagnosis and treatment services [5-7]. This was necessitated by the financial crisis that struck governments of sub-Saharan Africa in the 1980s, decline in government expenditure on health care delivery and breakdown of public health services. In practice, it involves the provision of essential generic drugs by donor agencies or national government to the district and village health management committees (composed of representatives of the community and the health centre heads).

These drugs are then sold to the public at a profit (user financing). This profit was supposed to be used to buy back the initial stock of drugs and to improve the quality of the centers like building toilets, placenta pits, renovation of buildings etc. However, the capacity of fees, in and of themselves, to enhance financial sustainability has been questioned [8].

There are concerns that user fees may restrict access to health services or lead to change in healthcare seeking behaviour which has been defined as "activity undertaken by individuals who perceive themselves to have a health problem or to be ill for the purpose of finding an appropriate remedy" [9] with its detrimental effect on the poor. In Nigeria where the incidence of poverty increased from 28.1% in 1980 to 65.6% in 1996 and the proportion of the extreme poor increased from 6.2% in 1980 to 29.3% in 1996 and the majority of the poor are located in the rural areas [10], such effects may be unacceptable. User fees seem to be a relatively weak policy tool because they focus on patients' behaviour rather than that of the providers.

Information on health seeking behaviour and health care utilization has important policy implications in health systems development. Factors which influence which treatment sources people seek when symptoms occur include socio-cultural factors like beliefs and household decision making to seek care, social networks, gender and economic status [11,12]. The introduction of user fees and cost of treatment are also determinants of health seeking behaviour [13-15]. There are indications that introduction of user fees in the public sectors have made a shift in the utilization of Public services, increasing the use of other treatment sources such as private health facilities, drug vendors and traditional healers as "the regular supply of drugs and the improvement in the technical quality of the services was not enough to compensate for the additional barrier created by the increased cost of services" [13]. Many reasons have also been advanced for households' and individuals' treatment seeking behaviour for the treatment of malaria. These include knowledge and duration of sickness, the anticipated cost of treatment, the patient's judgement of the intensity of sickness

accessibility to health facilities, level of endemicity in the population and demographic characteristics [16-18]. In addition, several studies have shown an association between treatment behaviour and outcome of malaria in children [19,20].

There has been considerable research to assess the impact of cost recovery in the form of user fees on health care seeking behaviour of people [21-23]. Many of these studies have concluded that access to care is generally reduced especially during the early stages of implementation. In Ghana [21] for example, the scheme resulted in a drop in attendance at health facilities, especially in rural areas and the reason given was the high cost of care. And in Kenya [22] there was a drop of 42% in attendance for curative services in fee-charging Kibwezi health centres while in Tanzania, there was 50% decline in use of out patients' facilities after the introduction of user fees [23]. However, there is no existing information on how user fees affect healthcare seeking in Nigeria for diagnosis and treatment of malaria. Studies have also investigated the impact of user fees on the demand for particular types of services [24-26] and there appear to be no studies on its effect on malaria. Others have examined health seeking behaviour in African communities [27-30] but there has been no similar community survey of health seeking behaviour in Nigeria with reference to the Bamako Initiative. The problems of devising mechanism to protect the poor and the disadvantaged from the adverse effect of user fees is a national priority and a policy challenge in Nigeria, but reliable information is needed to initiate such new policy thrusts. Basing new policy interventions on anecdotal evidence or intuitions could only result in misguided decisions [31]. The action taken by parents when a child is perceived to have malaria depends on whether the communities under study perceive malaria as a major childhood health problem [32]. There is therefore need to find out where and how people seek for treatment when they or members of their households fall sick in the light of increased cost of treatment resulting from the changes in the healthcare financing scheme introduced under the BI system. This paper has four main objectives:

- (1). Determining the socio-economic differentials of households in patterns of utilization of malaria diagnosis and treatment services
- (2). To assess whether there are socio-economic differences in the incidences of malaria.
- (3). To examine the determinants of use and non use of the BI health centres
- (4). Fashioning how the results can be used to improve the level of inequity engendered by the BI programme.

## Methods

Four local government areas that have been operating the Bamako Initiative in South-east Nigeria were used for the study. These were Ihiala and Nnewi-south LGAs in Anambra state and Isi-uzo and Oji River LGAs in Enugu state. The people from all the study areas are of "Igbo" ethnic groups and Christianity is the major religion in these communities, although traditional religion is still practiced by some people. An LGA is made up of different autonomous communities. The occupation of the inhabitants is mainly subsistence farming and petty trading. A few are civil servants.

The ethical committee of the University of Nigeria Teaching Hospital, Enugu, cleared the study. Additionally, consent was sought and obtained from the LGA chairman and all participating individuals before the study commenced.

In each of the four LGAs, four communities were randomly selected from a sampling frame of those communities that have at least one health centre giving a total of 16 communities. The Primary health care (PHC) house numbering system was used as the sampling frame to select randomly 100 households from each of the communities to give a total of 1600 households. The PHC house numbering had previously been conducted in the LGAs as a prerequisite for being admitted into the BI programme. Thus, in each household, one female household primary care giver, or the household head in her absence was interviewed using a pre-tested structured questionnaire (translated into the local "Igbo" language), administered by community health extension workers who received training for three days on this. Information was collected on the socio-economic and demographic status of the respondents, the diseases the respondents or any member of the family, had one month preceding the survey. For those who had malaria (using fever as a proxy for malaria) information was collected on how the disease was diagnosed including self diagnosis (an individual diagnosing himself as having malaria without direct involvement of another person), where treatment was sought first and reasons for choosing a particular care provider. Information was also sought on the second and third places patient sought treatment for the same episode of care in case they did not recover from the first malaria episode. Inter- and intra-interviewer variation was checked.

The data from the 4 LGAs were pooled and then analysed with SPSS statistical package. A socio-economic status (SES) index was used to examine whether there are systematic differences in seeking for diagnosis and treatment by socio-economic group and the specific choice of care provider with reasons for non-use of BI health centres. To construct a relative index of socioeconomic status, we combined household-level information on assets and

household income. The main difficulty in constructing this type of index is the choice of appropriate weights for each item. We used the Principal components analysis (PCA) [33,34], to define these weights. The input to the PCA was information on ownership of radio, bicycle, motorcycle, television and motorcar together with the cost of food [35-37]. This enabled us to classify the study populations into four quartiles (least poor, poor, very poor and poorest). The cost of food was used to proxy income since it is difficult to collect reliable information on household income and estimates show that 62.8 % of Nigerians spend between 70% and 80% of their income on food [10]. Consumption expenditures were used to divide households into "income" quintiles [31] and in Thailand, income was used to classify households into poor and non-poor [38].

In tests of validity, non-parametric tests were used to examine the bivariate relationships between the input variables for the indices and the indices themselves. In addition, multiple regression analysis with the PCA-generated weights as one of the independent variables were undertaken to investigate whether the SES quartiles will still be related to the dependent variables in manner expected by economic theory when confounding variables are controlled for. Chi-square tests were used to test for any statistical difference between variables.

## Results

The total number of usable questionnaires for data analysis from the pooled data from the four local government areas (LGAs) was 1594. About half of the respondents were heads of households and the rest were representatives of the households (Table 1). The table also shows that most of the respondents were middle-aged and females formed a slight majority of the respondents. Most of the respondents were married and had an average of 6 years of formal education. The average household size was 5.1 Most of the households owned a radio set. However, minorities owned a fridge, television set, motorcycle and motorcar. The respondents were evenly distributed across the socio-economic quartiles.

Table 2 shows that malaria was the major tropical disease that households had one month prior to the survey being 1254(78.7%). Malaria was followed distantly by diarrhoea diseases 244(15.3%), eye disease 155(9.7%) and respiratory diseases (excepting tuberculosis) 91(5.7%). Others are malnutrition 55(3.5%), onchocerciasis 29(1.8%), and HIV/AIDS 2(0.1%).

Table 3 shows that of those with malaria episodes one month preceding the survey, self diagnosis 993(79.2%) was more common among the respondents. This was followed by diagnosis through laboratory tests 112(8.9%),

**Table 1: Socio-economic and demographic characteristics of the respondents (n = 1594)**

| Variables   | n (%)             |
|---|-------------------|
| Status: 1 = head                                  | 788 (49.4)        |
| 0 = representative                                | 806 (50.6)        |
| No of household residents: Mean (S.D)             | 5.1 (3.5)         |
| Age (years): Mean (S.D.)                          | 46.94 (14.42)     |
| Sex: 1 = male                                     | 760 (47.7)        |
| 0 = female  | 834 (52.3)        |
| Years of Formal education: Mean (S.D.)            | 6.0 (5.9)         |
| Marital status: 1 = married                       | 1464 (91.8)       |
| 0 = never married                                 | 130 (8.2)         |
| Households previous week's food cost: Mean (S.D.) | 2851.02 (3009.20) |
| Household with a radio: 1 = yes                   | 1419 (89.0)       |
| 0 = no  | 175 (11.0)        |
| Household with a fridge: 1 = yes                  | 428 (26.6)        |
| 0 = no  | 1171 (73.4)       |
| Household with a TV: 1 = yes                      | 492 (30.8)        |
| 0 = no  | 1102 (69.2)       |
| Household with a bicycle: 1 = yes                 | 747 (46.9)        |
| 0 = no  | 847 (53.1)        |
| Household with a motorcycle: 1 = yes              | 563 (35.3)        |
| 0 = no  | 1031 (64.7)       |
| Household with a motor car: 1 = yes               | 147 (9.2)         |
| 0 = no  | 1447 (90.8)       |
| 1 <sup>st</sup> Quartile (Poorest)                | 397 (24.9)        |
| 2 <sup>nd</sup> Quartile (Very poor)              | 397 (24.9)        |
| 3 <sup>rd</sup> Quartile (Poor)                   | 400 (25.1)        |
| 4 <sup>th</sup> Quartile (Least poor)             | 400 (25.1)        |

**Table 2: Health conditions that respondents had one month prior to the interviews**

| Diseases                                      | n (%)       |
|---|-------------|
| Malaria                                       | 1254 (78.7) |
| Diarrhoea                                     | 244 (15.3)  |
| Eye disease                                   | 155 (9.7)   |
| Respiratory diseases (excluding tuberculosis) | 91 (5.7)    |
| Malnutrition                                  | 55 (3.5)    |
| Onchocerciasis                                | 29 (1.8)    |
| Tuberculosis                                  | 15 (0.9)    |
| HIV/AIDS                                      | 2 (0.1)     |
| Others  | 7 (0.4)     |

community health workers 73(5.8%), family members 58(4.6%) and traditional healers 18(1.5%).

Table 4 shows that once malaria has been diagnosed through symptom identification or laboratory tests, various resources were used in the treatment of the disease. For more than one third of the households 451(36%), the initial choice of care for malaria was the patent medicine

**Table 3: Source of diagnosis for malaria (n = 1254)**

| Source of diagnosis     | N(%)       |
|-------------------------|------------|
| Self                    | 993 (79.2) |
| Laboratory test         | 112 (8.9)  |
| Community health worker | 73 (5.8)   |
| Family member           | 58 (4.6)   |
| Traditional healer      | 18 (1.5)   |

dealers. This was followed by the government hospitals 339(27.1% and the health centres 221(17.6%). About 147(11.7%) consulted traditional medicine healers for treatment, private clinics 29(2.3%), community health workers 24(1.9%). Only 43(3.4%) had their treatment at home. Also, the table shows that the initial choice of care for malaria for half of the respondents was private health facilities (Traditional medicine healers, clinic and Patent medicine dealers). However despite the large number of households using these private facilities, there was a steady decline among those who chose them as a second source of care and an increase (71.4%) in the utilization of public health facilities (health centres, general hospitals and community health workers) as a second choice of care.

The socio-economic differential in the incidence of malaria is presented in Table 5. It shows that the occurrence of malaria does not differentiate between different SES quartiles as there was no statistical difference between the quartiles. The poorer the respondents, the more likely it is that they will resort to self diagnosis and also rely on a family member to diagnose their malaria. And the least poor are more likely to use laboratory services for the diagnosis of malaria. Also the poorer the respondents, the more likely it is that they will use traditional healers, patent medicine dealers and community health workers for the treatment of malaria while the least poor households are more likely to use the services of private clinics that offer apparently better quality of services. It is pertinent to note that quality of care is a subjective variable for which it is difficult to find an objective and measurable proxy. One concern about quality is who defines it. While it is client's perspective (perceived quality) that is ultimately the most important determinant of health care services, clients are unable to make meaningful evaluation of some aspects of service quality (technical quality) [39]. For example, clients often consider multiple prescriptions and prescription of injections as high quality health care, whereas from a technical perspective, prescription of a single, orally administered drug is the safest and often most effective [40]. However the importance of peoples' perception of quality was demonstrated when it was

found that the ill and poor people by-passed free or subsidised services in facilities they perceived to be offering low quality services [41].

The richer households were more likely to use the BI health centres. Though the poorest quartiles were more likely to use patent medicine dealers, this was not statistically significantly different across the quartiles. Also the least poor were more likely to use the general hospitals but this was not statistically significantly different across the quartiles. The richer households were more likely to complain about poor staff attitude and the lack of drugs as their reasons for not attending the BI health centres. The other reasons people gave for not using the BI health centres were not statistically significantly different across the SES quartiles.

The reduced logistic model showed that the SES quartiles had the correct signs, using the 1<sup>st</sup> quartile as the base variable (Table 6). However, only the 3<sup>rd</sup> quartile was statistically significant and the result shows that as the quartile increases, the likelihood of using the BI health centres increases. The table also shows that as the number of household residents increases, the possibility that the health centre will be used decreases. The results also show that people with malaria were likely to seek for treatment in the health centres. The factors that encouraged people to seek for treatment at the health centres were the perceived good quality of services there, the fact that the centres were near the people and that the health workers were deemed to be polite. The logistic model correctly predicted more than 80% of the observations and was statistically significant.

## Discussion

This study was a random community-based survey of illness experience and health seeking behaviour in communities where the Bamako Initiative is being practiced. Majority of the sample experienced at least one reported episode of illness in the one month preceding the survey and most of the illnesses were due to malaria. However, it should be stressed that these incidence levels represent self-reported morbidity since we did not confirm the diagnosis. Most cases of fever could have been reported to be malaria by the respondents since we used fever as a proxy for malaria. This rate of illness episode is quite high and contrasts with that in other African studies, which have calculated rates of 20.8–25% over a 2-week recall period and 33.1–43.8% with a 12-month recall period. [27,28,30].

Majority of the illness episodes were due to malaria. Diarrhea diseases, Eye diseases, Pneumonia and malnutrition followed this. This confirms the trend in Nigeria where 50% of illness episode is due to fever (malaria) and

**Table 4: Pattern of treatment seeking for Malaria**

|                                 | Traditional medicine healer N (%) | Private Clinic N(%) | Patent medicine dealer N(%) | Community health worker N(%) | BI health centre N(%) | General Hospital N(%) | Home N(%) |
|---------------------------------|-----------------------------------|---------------------|-----------------------------|------------------------------|-----------------------|-----------------------|-----------|
| First choice of care (N = 1254) | 147(11.7)                         | 29(2.3)             | 451(36)                     | 24(1.9)                      | 221(17.6)             | 339(27.1)             | 43(3.4)   |
| Second choice of care (N = 253) | 32(12.7)                          | 10(4)               | 28(11.1)                    | 4(0.6)                       | 65(25.7)              | 114(45.1)             | 0(0.00)   |
| Third choice of care (N = 60)   | 4(6.7)                            | 0(0.00)             | 3(5)                        | 1(1.7)                       | 24(40)                | 28(46.7)              | 0(0.00)   |

**Table 5: Socio-economic differences in malaria incidence, diagnosis and treatment sources and reasons for non use of health centres**

| Variable  | N    | Socio-economic status Quartile |                 |            |                  |                       | P – value |
|---|------|--------------------------------|-----------------|------------|------------------|-----------------------|-----------|
|   |      | Poorest N (%)                  | Very poor N (%) | Poor N (%) | Least Poor N (%) | Poor-rich ratio Q1/Q4 |           |
| <b>Incidence of malaria</b>                       | 1254 | 303 (24.1)                     | 300 (24)        | 325 (25.9) | 326 (26)         | 0.93                  | 0.6799    |
| <b>Sources of diagnosis</b>                       |      |                                |                 |            |                  |                       |           |
| Traditional healer                                | 18   | 6 (33.3)                       | 3 (16.7)        | 5 (27.8)   | 4 (22.2)         | 1.5                   | 0.2565    |
| Family member                                     | 58   | 33 (56.9)                      | 9 (15.5)        | 8 (13.8)   | 8 (13.8)         | 4.12                  | 0.0000*   |
| Community health worker                           | 73   | 15 (20.6)                      | 17 (23.3)       | 22 (30.1)  | 19 (26)          | 0.79                  | 0.2565    |
| Laboratory test                                   | 112  | 24 (21.4)                      | 18 (16.1)       | 33 (29.5)  | 37 (33)          | 0.65                  | 0.0099*   |
| Self  | 993  | 246 (24.8)                     | 270 (27.2)      | 242 (24.4) | 235 (23.6)       | 1.1                   | 1.0000    |
| <b>Sources of treatment</b>                       |      |                                |                 |            |                  |                       |           |
| Traditional healer                                | 147  | 43(29.2)                       | 51(34.7)        | 32(21.8)   | 21(14.3)         | 2.04                  | 0.0027*   |
| Patent medicine dealer                            | 451  | 132(29.3)                      | 116(25.7)       | 106(23.5)  | 97(21.5)         | 1.36                  | 0.1623    |
| Community health worker                           | 24   | 12(50)                         | 7(29.2)         | 3(12.5)    | 2(8.3)           | 6.0                   | 0.0000*   |
| BI health centre                                  | 221  | 42(19)                         | 48(21.7)        | 64(29)     | 67(30.3)         | 0.63                  | 0.0391*   |
| General hospital                                  | 339  | 68(20.1)                       | 82(24.2)        | 94(27.7)   | 95(28)           | 0.72                  | 0.1487    |
| Private clinic                                    | 29   | 2(6.9)                         | 6(20.7)         | 9(31.0)    | 12(41.4)         | 0.17                  | 0.0000*   |
| Home  | 43   | 12(27.9)                       | 12(27.9)        | 8(18.6)    | 11(25.6)         | 1.09                  | 0.4406    |
| <b>Reasons for not using the BI health centre</b> |      |                                |                 |            |                  |                       |           |
| <b>Lack of drugs</b>                              | 337  | 60 (17.8)                      | 74 (21.9)       | 102 (30.3) | 101 (30)         | 0.59                  | 0.0232*   |
| Too far   | 214  | 53 (24.7)                      | 50 (23.4)       | 56 (26.2)  | 55 (25.7)        | 0.96                  | 0.7971    |
| Poor staff attitude                               | 166  | 33 (19.9)                      | 39 (23.5)       | 38 (22.9)  | 56 (33.7)        | 0.59                  | 0.0303*   |
| Unaffordable cost                                 | 113  | 33 (29.2)                      | 26 (23)         | 25 (22.1)  | 29 (25.7)        | 1.14                  | 0.6060    |
| Long waiting time                                 | 133  | 25 (18.8)                      | 46 (34.6)       | 26 (19.5)  | 36 (27.1)        | 0.69                  | 0.679     |
| Lack of doctor                                    | 470  | 99 (21.1)                      | 121 (25.7)      | 124 (26.4) | 126 (26.8)       | 0.78                  | 0.353     |

Note: \* =  $p < 0.05$ . = statistically significant

is usually followed closely by diarrhea and Pneumonia [42]. The appearance of eye disease as an important disease is due to the fact that onchocerciasis is endemic in two of the LGAs. About 3.4% of malaria illness episode did not lead to any consultation. Higher non-consultation rates have been noted in Cameroon [30] and Kenya [29].

Households in the least poor quartiles have the same likelihood to suffer from malaria just like the households in

the poorest quartile. A study in Tanzania [34] also found no socio-economic differential in fever occurrence (as a proxy for malaria) and a recent review [43] also found little evidence that fever prevalence is related to socioeconomic status, but argued that there are likely to be mortality differences arising from differential access to effective treatment. However, a survey in Zambia [44] found a substantial higher prevalence of malaria infection among the poorest population groups.

**Table 6: Logistic regression analysis to determine explanatory factors for seeking treatment in the Health centres**

| Variables                              | Full model Coefficient (SE) | Reduced model Coefficient (SE) |
|--|-----------------------------|--------------------------------|
| Quartile 2                             | .15 (.40)                   | .09 (.25)                      |
| Quartile 3                             | .46 (.36)                   | .51 (.25)***                   |
| Quartile 4                             | .34 (.40)                   | .41 (.25)                      |
| Status in the household                | .18 (.37)                   |                                |
| No. of household residents             | -.19(.06)***                | -.12 (.04)***                  |
| Sex                                    | -.17 (.38)                  |                                |
| Age                                    | -.01 (.01)                  |                                |
| Education                              | -.01 (.02)                  |                                |
| Marital status                         | -.31 (.42)                  |                                |
| Expenditure on first action            | -.001 (.0003)***            | -.001 (.00001)***              |
| Expenditure on second section          | .00003 (.0001)              |                                |
| Expenditure of all other actions taken | -.0001 (.00001)             |                                |
| Had malaria                            | 1.82 (.50)**                | 1.05 (.28)***                  |
| Whether patient sought treatment       | 2.08 (1.09)*                | 1.09 (.78)                     |
| Good services                          | .77 (.29)***                | .53 (.19)***                   |
| Available drugs                        | -.24 (.28)                  |                                |
| Near the homes                         | .78 (.25)***                | .94 (.18)***                   |
| Affordable services                    | .27 (.29)                   |                                |
| Prompt attention                       | -.03 (.29)                  |                                |
| Polite health workers                  | 1.93 (.34)***               | 1.78 (.22)***                  |
| Constant                               | -3.74 (1.33)***             | -4.03 (.86)***                 |
| LR chi2                                | 150.46***                   | 201.80***                      |
| Pseudo R2                              | 0.25                        | 0.19                           |
| Correct predictions                    | 83.30%                      | 84.82%                         |

Significance of parameters \* <0.10, \*\*<0.05, \*\*\*<0.01

Self-diagnosis was more common in all the LGAs and among the poorest group with no statistical difference across the socioeconomic quartiles. However, in India, people from high socioeconomic group were more likely to engage in self diagnosis [45]. This was followed by laboratory diagnosis, Community health workers and traditional healers. This pattern of diagnosis is expected because of our cultural setting in which we still believe in self-diagnosis and hardly seek for proper diagnosis as a first resort rather believing in ones intuition.

A comparison of the pattern of health seeking behavior across the socio-economic quartiles shows that a large part of the population does not use the BI health centers where user fees are supposed to be lower since at that level, no fees are charged for consultations and the mark-up for the drugs are also supposed to be minimal being 20% [46]. And the pattern of care seeking among the socio-economic quartile indicates that the wealthier population groups have a higher probability of seeking care at the health centers. Thus utilization has shifted away from the targeted population group of the poor creating equity problem in BI. Also the wealthier population groups have a higher probability of seeking care at hospitals, and private clinics as there is an upward trend by quartiles in the use of these facilities. This is as expected. Those in higher quartiles also use the Patent Medicine Dealers and Com-

munity health workers less often. This trend of wealthier population groups having a higher probability of seeking care at the health centers contrasts with the findings in Benin and Guinea [47] where the poor have a tendency to use the public health centers to a larger extent than the rich. This trend in our study could be due to the fact that these public health facilities including the BI health centers may be charging higher fees thereby deterring patients from using them. It has been argued that "health interventions initially reach those of higher socio-economic status and latter affect the poor" [48]. Also "benefits meant exclusively for the poor often end up being poor benefits" [49] and a world bank report noted that "Key services fail poor people in access, in quantity, and in quality" [50].

Respondents who used the health centers buttressed the fact that the BI health centers charged higher fees than other health providers in the areas. However, the reason for the Benin and Guinea results could be that the health centers were just newly revitalized and with subsidized care, and their evaluation took place few years after the inception of the BI program when things were still fresh. Our study is occurring almost a decade after.

Once malaria has been diagnosed through symptom identification or laboratory tests, various resources were used in the treatment of the disease. For more than one third of

the households, initial choice of care for malaria was the patent medicine dealers. This was followed by the hospitals and the health centres. Also, the table shows that the initial choice of care for malaria for half of the respondents was private health facilities (Traditional medicine healers, private clinics and Patent medicine dealers). However despite the large number of households using these private facilities, there was a steady decline among those who chose them as a second source of care and an increase in the utilization of public health facilities (health centres, general hospitals and community health workers) as a second choice of care. The treatment seeking process for malaria has been noted to be a sequential process involving several stages [51] and many reasons have been advanced for households' and individuals' malaria treatment seeking behaviour [16,17].

The increased use of Private health facilities may be related to the development of the private health sector in Nigeria. Continued economic difficulties have undermined the public health system and there is the rise in the "informal" private sector like the traditional medicine healers, itinerant drug peddlers and hawkers, mixed trade dispensers, unlicensed patent medicine dealers and injection doctors. This sector, which is likely to offer very low quality treatment (treatment without laboratory diagnosis, making wrong diagnosis, sale of drugs with little regard for dosage or treatment regimen and use of fake and expired drugs), is also likely to be a more important source of disease treatment and prevention for the poor. And government encourages frequent media advertisement of traditional medicine healers who openly challenge the utility of western medicine, thus making them very popular especially among the poor. Also, in Nigeria, Doctors in public services are allowed to operate private clinics. Some of these facilities are below standard (unregistered, poorly equipped, lack of diagnostic facilities, dirty premises, employing auxiliaries to work as registered nurses, dispensing medicines and irrational prescribing).

The poorest households are more likely to use traditional medicine healers, patent medicine dealers and community health workers. These health care providers are likely to offer very low quality treatment and it is inequitable because they are the most important source of treatment of malaria for the poorest quartiles.

The reasons that deter the least poor households from using the BI health centers were lack of drugs and poor staff attitude. Thus, contrary to expectations, cost though vital was not the prime reasons for non-use. This concurs with the findings of a previous study in Nigeria where only 2% of cases had cost as an important consideration for patient care [52]. In logistic analysis to examine the determinants of use of health centers, the availability of

good services, proximity of the centers to the homes and polite health workers were reasons that made the people to use the services there. The effect of the SES quartiles on the use of the health centers persisted to an extent, when the con-founders were controlled for. The geographical proximity of services to peoples' homes has been noted as one of the most important factors that affects utilization of health services, particularly in rural areas of developing countries [53]. These authors asserted that as distance increases the level of utilization decrease and vice versa, and that hence people who live far away from services suffer a greater disadvantage regarding the use of services if they are also poorer and transport is expensive.

Furthermore, the decision as to where to seek health care depends upon many factors including the availability of a provider within the community, reputation of the provider, perceived quality of the services, the perceived cause of the disease, cost of treatment, and the arrangements for payment [54]. The cost of orthodox health care is increasingly becoming a hindrance to many health care seekers, leading them to look at alternative providers. For instance the cost of treating malaria in Nigeria is 1.84 US dollars monthly per household [4]. Drug peddlers and drug store operators provide services, which are closer to the people and may be cheaper at the short run than services from regular health care providers because of non-payment of consultation fees and transport expenses [54]. They offer treatment for common ailments like fever, diarrhea, headache and stomach. A study of health care seeking behavior in rural and urban health centers in three districts in Ghana showed an initial increase in cost saving measures like self-medication after introduction of user fee policies [54]. In Burkina Faso, self treatment was also found to lower cost of treatment and is more common for illness episodes that are not considered severe [55]. However, the potential dangers of self-treatment like over-dosing and problems of resistance have been noted in several studies [56-58].

It is not clear why lack of drugs in health facilities that operate under the BI system was one of the reasons for not using the health centers. It could mean that occasionally drugs get stocked out at the health centers or that some of the patients were not having their type of prescribed drugs.

## Conclusions

Community members use private and public health care facilities equally for the treatment of malaria and self diagnosis for malaria is common but practiced more by the poorer households.

A large part of the population does not use the BI health centers. The pattern of care seeking among the socio-eco-

conomic quartile indicate that the least poor population groups have a higher probability of seeking treatment care at the BI health centers, hospitals, and private clinics and in using laboratory procedures. They also use the Patent Medicine Dealers and Community health workers less often for both diagnosis and treatment. However we do not know anything about utilization patterns by socioeconomic groups prior to the introduction of the BI as no records were available. We acknowledge this to be a limitation in this study.

The factors that encourage people to use services in BI health centers like availability of good services, proximity of the centers to the homes and polite health workers should be enhanced while the factors that deter people from consuming services at BI centers even in the face of improvements brought about by the BI program should be eliminated if the program is to become more effective and sustainable. The use of laboratory services for the diagnosis of malaria should be encouraged through appropriate information, education and communication which at the long run will be more cost effective and cost saving for them while devising means of reducing the equity gap created. A potential policy option will be granting fee exemptions to the poor which needs to be worked out properly and implemented or completely abolishing user fees for the diagnosis and treatment of malaria in BI health centers.

### Competing interests

None declared.

### Authors' contributions

Both authors participated in the design of the study. BU collected the data, while both authors performed the statistical analysis. BU wrote up the manuscript and both authors read and approved the final manuscript.

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