What co-morbidities do people with malaria have and what are their patterns of health seeking in Nigeria?

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Abstract

Background: This study assessed the comorbidities associated with malaria and patterns of health seeking in southeast Nigeria.

Materials and Methods: The survey was undertaken in Enugu state, Southeast Nigeria. Data were collected from 500 householders, 200 in-patient and outpatient exit surveys and data abstraction from 125 inpatient and outpatient records.

Results: A total of 307 (64.2%) households had an episode of malaria within 1 month of the interview. The most common malaria comorbidities were upper respiratory tract infection and diarrhea. Most patients first sought treatment from patent medicine vendors. The average monthly cost of treating the comorbidities was 270 Naira (1.75 USD) and 601 Naira (3.89 USD) for outpatient department and inpatient department respectively.

Conclusion: The economic burden of malaria is compounded by comorbidities and inappropriate health seeking behavior. Interventions to control malaria are required to also control common comorbidities.

Key words: Co-morbidity, costs, health-seeking pattern, malaria

Introduction

One of the major health issues facing most developing countries is the challenge being posed by the malaria.[1] Apart from the high mortality and morbidity rate, the high cost of malaria treatment also places a huge economic burden on individuals and entire economies.[1,2]

Prior to the most recent World Health Organization guidelines which advocates testing a patient before treatment with first line artemisinin-combination therapies, febrile illnesses were frequently treated as uncomplicated malaria on presentation, and patients only tested when there is poor response to treatment.[3]

In most malaria high transmission settings, the presumptive approach was previously encouraged by the Integrated Management of Childhood Illnesses guidelines and little or no diagnostic tests were used to confirm malaria.[4] This arguably contributed to the over-diagnosis of malaria and hence multiple drug prescribing in order to take care of other childhood febrile illnesses.[4]

Children in developing countries get ill and die in large numbers from a relatively small number of causes, frequently presenting with more than one problem and those with multiple problems are more likely to die.[1] This comorbidity is more than would be expected by chance alone, and is largely due to common risk factors, particularly malnutrition. This view is reinforced by studies of the etiology of pneumonia and diarrheal diseases in developing

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countries, which reveal a population of high risk, often malnourished children from whom multiple pathogens can be identified.[5] Severe malaria is difficult to differentiate clinically from other common illnesses such as pneumonia and sepsis.[4-7]

In most malaria endemic areas, which are usually low income countries, microscopy or other tests to confirm parasitemia are usually unavailable or unreliable and also not affordable.[5] This seems to have strongly encouraged the inability to distinguish between malaria and other illnesses because observations from several studies point to the fact that severe illness in genuinely parasitemic children is not always due to malaria.[8-10] In endemic areas, as many as 80% of children in the community may have an associated co-morbidity which will significantly raise the cost of hospitalization as well as the length of hospital stay.[10]

Due to the unreliability of malaria test results observed in malaria endemic regions, the tendency to over-diagnose cannot be ruled out. Consequently in order to avoid the danger of neglecting other life-threatening conditions, which may have a similar presentation to malaria, both antimalarials and antibiotics are often prescribed thereby driving up the cost of malaria treatment for the individuals concerned.[1]

In addition to comorbidities, the health seeking behavior of households also contribute to the economic burden of malaria as studies in Nigeria and some other sub-Saharan African countries have shown that majority of households initially visit patent medicine vendors (PMVs) and other sources for treatment, including home care before finally attending a healthcare setting where a proper diagnosis is made.[11-15] This pattern of treatment has been found to be reinforced when treatment has been perceived as successful.[16] Households invariably incur cost at these various sources, which increase the total costs attributed to malaria treatment.[17,18]

This paper hence provides new information to help close the knowledge gap on how the treatment seeking behavior and comorbidities bias the perceived economic burden of malaria in Nigeria. The paper also presents some new information on the treatment seeking pattern of households for children with malaria, costs incurred by households at these first points of treatment, the costs of attendant comorbidities and the policy implications of the findings.

Materials and Methods

Study area
The study was undertaken in two malaria holoendemic communities in Oji-River local government area of Enugu state. The state is located in Southeast Nigeria

with an estimated population of 3,267,873 million and an under-five population of 11.8% (National Population Commission). Two were used for the study.

Study design
This comprised a household survey and health facility study in selected facilities in the study site. The health facility study was both retrospective and prospective in six purposively selected facilities (three per community) in the two communities. These were the facilities that offered both outpatient and inpatient services. Information was extracted from outpatient and inpatient records that are usually found in patient's folders in the records department of the health facilities.

Household survey
A systematic random sampling technique was used to select an adequate sample size of 500 households in both communities. A list of all the households with children under 5 years was compiled to get a sample frame of the households with children under 5 years. The primary caregiver or representatives in each of these households were interviewed after obtaining informed consent by trained interviewers, using semi-structured interviewer administered questionnaires. Information was collected on personal data and demographics of respondent, malaria status of children under five within the past 1 month and the healthcare seeking pattern for malaria treatment.

Health facility survey
Exit interviews
A total of 200 exit interviews was undertaken. Each of the selected health facility was assigned a certain number of exit interviews based on their patient base. A purposive sample of health facilities was used to select six facilities based on their geographic location and patient load. These were a public hospital, four primary healthcare centers and a mission hospital. Data was collected by trained field workers using a semi-structured questionnaire. Information was collected on the amount of money spent to treat a child for malaria (direct costs) and also on the amount of money spent for food or accommodation while the child was still in the facility (indirect costs).

Outpatient and inpatient data abstraction
For outpatient visits, a systematic sampling technique was used to identify patient records from the records of patients who had been diagnosed with malaria. Data from medical records was collected for a 1 year period. A combination of retrospective and prospective methods was used (11 months of retrospective and 1 month of prospective). A random number was selected between 1 and 10 to select the starting patient folder in a given month. For each month of data collection from patient records, after the first patient folder was randomly selected,

then every subsequent 3rd patient folder was selected for inclusion. All patient records in the sample were carefully reviewed with the objective of documenting the level of utilization of resources per patient. Patient-specific resource utilization data for direct medical costs for outpatients and costs incurred for same episode of illness before coming to the facility were collected. The direct medical costs include the cost of drugs, diagnostics, administration fees, and other costs incurred, as a result, of the treatment attributed to malaria.

For inpatients, data were collected over a period of 2 years (23 months retrospective and 1 month prospective) from 125 inpatient records. The inpatient data was collected over a longer period to enable the computed sample size to be achieved due to low number of patients admitted for malaria. Information collected from the records include demography, costs of treatment of malaria, and any attendant co-morbidity, the length of stay; the type, frequency, amount, duration, and route of administration of malarial drugs and other medications (e.g. antibiotics). Data were also collected on discharge medications directly related to the malaria episode, and laboratory tests and procedures documented by quantity and type. Costs incurred from other sources that the treatment was sought for the same episode of illness before attending the facility were also collected.

Data analysis
The data were analyzed using tabulations, cross-tabulations, and testing of means for prevalence of co-morbidities, health seeking, and costs as applicable. Direct and indirect costs of treatment were computed.

Ethical considerations
Ethical approval for the study was obtained from the Ethics Review Board, University of Nigeria. Each respondent gave a signed informed consent. In addition, the heads of each facility gave an informed consent before data was abstracted from each of them. Consent was obtained from the hospital authorities to use anonymized data extracted from the hospital database for the study. Note: 154.06 Naira = 1 USD (Central Bank of Nigeria, Nigeria exchange rate).

Results

Sociodemographic characteristics of respondents from the household survey
The mean age of respondents was 33 years, and majority of the respondents (96.8%) were females. The two major occupations were petty trading and subsistence farming. The average number of people in the household was 5 and of the households interviewed, 307 had at least one child under 5 years who had suffered an episode of malaria within the month prior to the survey [Table 1].

Health seeking behavior
The results show that 307 (61.4%) households had at children with an episode of malaria within the last 1 month of the survey and this, almost two thirds (64.2%) of households first sought treatment from a PMV [Table 2]. In the exit interviews, this information was only available from 131 (65.5%) of the 200 respondents interviewed, and similarly majority of respondents from the exit interviews (57.7%) had also sought treatment from a PMV before attending the facility where they were interviewed.

Outpatient department visits and inpatient department stays comorbidities
From 125 outpatient and inpatient case notes each, 84, and 97 cases of comorbidity were observed respectively. In both outpatient department (OPD) and inpatient department (IPD), the most common comorbidity associated with malaria was upper respiratory tract infection (70.2% and 57.7%), followed by diarrhea (17.8% and 22.7%), respectively [Table 3].

Table 1: Sociodemographic characteristics of respondents

Variable	Measurement
Sex: *n* (%)	
Female	484 (96.8)
Male	16 (3.2)
Age (years): Mean (SD)	33 (9.20)
Occupation: *n* (%)	
Unemployed	39 (7.8)
Subsistence farmer	109 (21.8)
Petty trading/artisan	137 (27.4)
Employed in the public sector	37 (7.4)
Employed in private sector	12 (2.4)
Big entrepreneur	48 (9.6)
Self-employed in small or medium scale enterprise	39 (7.8)
Others	80 (16.0)
Number of people in household: Mean (SD)	5 (1.85)
Number of HH with children with malaria in past 1 month	307 (61.4)

SD=Standard deviation; HH=Households

Table 2: Pattern of health seeking from household survey and exit interview

Where treatment first sought	*n* (%)
Household survey: *n*=307	
Patent medicine dealer	197 (64.2)
Hospital	73 (23.8)
Health center	34 (11.1)
Others	3 (0.97)
Patient exit interviews: *n*=131	
Patent medicine dealer	115 (57.7)
Primary healthcare center	8 (4.0)
Hospital	5 (2.5)
Others	3 (1.5)

Table 3: Analysis of comorbidities for OPD and IPD cases

Comorbidities	n (%)
OPD n=84	
Upper respiratory tract infection	59 (70.2)
Gastroenteritis (diarrhea)	15 (17.8)
Injuries (cuts and bruises)	8 (9.5)
Others	2 (2.4)
IPD n=97	
Upper respiratory tract infection	56 (57.7)
Gastroenteritis (diarrhea)	22 (22.7)
Anemia	9 (9.3)
Others	10 (10.3)

OPD=Outpatient department; IPD=Inpatient department

Table 4: Costs associated with OPD and IPD comorbidities

Variable	Naira (SD)	USD (SD)
OPD (n=85)	270.12 (293.4)	1.75 (1.90)
IPD (n=115)	600.82 (663.4)	3.89 (4.31)

OPD=Outpatient department; IPD=Inpatient department; SD=Standard deviation; USD=United States dollar

Cost of malaria treatment to households

The average outpatient and inpatient costs of taking care of a child sick with malaria were 1938 Naira (12.57 USD), and 3534 Naira (23.20 USD) per episode of malaria respectively.

Costs of comorbidities (outpatient department and inpatient department)

The average cost per case of a malaria co-morbidity for OPD and IPD were 270.12 Naira (1.75 USD), and 600.82 Naira (3.89 USD), respectively [Table 4].

Discussion

The high level of use of PMVs as the first line of treatment contributes to wrong diagnosis, inability to detect malaria comorbidities and inadvertently increase the burden of malaria. The finding that majority of the patients patronize PMVs first before going to a health center or a hospital is similar to the observations documented in a previous study where the first choice of provider was also the patent medicine dealer, followed by the hospital and health center.[19] This could be due to the fact that in most cases the patent medicine dealers are usually within the communities and are more accessible to the respondents than the hospitals and health centers. However, outside Nigeria, similar health seeking behavior is also found both in sub-Saharan Africa and beyond.[12,13,15]

The most common comorbidity associated with malaria in both OPD and IPD was upper respiratory tract disease followed by diarrhea. This is not surprising because Nigeria being a low-income country in the tropics is plagued by a multitude of childhood febrile illnesses which are often mistaken for malaria and based on the Enugu state data, pneumonia, and diarrheal diseases rank highly amongst the common childhood diseases in the region.[20] Proper diagnosis of co-morbidities is usually done in a healthcare setting and is not normally detected during visits to patent medicine dealers, which is the first port of call for treatment of Malaria in our study site.[21] As a result, extra costs are invariably incurred due to the predominant health seeking pattern and this further drives up the costs attributed to the treatment of malaria. These comorbidities constitute an additional financial burden on individuals and households considering the additional cost of the drugs and other services being rendered.

The treatment cost per case for IPD was greater than that for OPD and this was due to the cost of hospitalization, special services, co-morbidities, and other systemic complications that can arise from severe malaria.[22] These complications make patients to spend more time in the hospital thereby incurring more costs than outpatients and the indirect cost of the disease will undoubtedly be high taking into consideration that the parents will spend more days caring for the sick child causing a reduction in their potential earning power.[23]

The results also showed that in IPD cases, most of the patients had sought treatment from other places and incurred some costs before finally arriving at the health facility where they were interviewed. This health seeking pattern most likely contributed to increasing the cost of treating the disease because the fact that they still came to the health facilities for treatment of the same sickness shows that they were not properly cured even after having incurred some costs in those other places.

From our study, we find that the combined cost of treating malaria and a comorbidity in the OPD costs an additional two dollars on the individual and hence household, and even higher when treated as an inpatient. This will constitute a huge burden on the respondents who are mostly rural dwellers. In most low-income countries where the average income is less than 1 $ a day this will impact heavily on family income. That malaria is an economic burden to households is a known fact but the insidious inclusion of comorbidities will cause an even higher economic burden to the families. The indirect cost to households of the disease would be quite high and could constitute an impediment to control of the disease, especially with most expenditure paid out-of-pocket by consumers.[18]

Conclusion

The health seeking pattern of households delays early definitive diagnosis of malaria and any attendant comorbidity hence increasing overall treatment costs both

directly and indirectly to households. Traditional health seeking patterns and contextual treatment guidelines may be contributory factors, and behavioral change education is needed to address this.

The limitation of this study is that data for health seeking and comorbidity were collected on different study groups respectively, hence was not possible to statistically determine if there is a direct association between the health seeking pattern and presence of comorbidities during episodes of malaria.

Acknowledgement

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