# FROM HOME TO HOSPITAL: BELIEFS AND PRACTICES RELATED TO SEVERE MALARIA IN SUDAN

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**هدف الداسة :** الحاجـة إلى تدابير فاعلـة لخفض الإصـابة بـالملا ريا الوخيمـة والوفيـات الناتجـة عنها يحتـاج إلى التعرف على المفاهيم والممارسات السائدة على مستوى المنزل ووحدات الرعاية الصحية الأولية. هدفت هذه الدراسة إلى التحري عن المفاهيم والممارسات ذات الصلة بمعالجة الملاريا الوخيمة بوسط السودان كما تهدف إلى التعرف على الموانع التي تحول بين المريض وطلب الاستشارة مبكراً.

**طريقة الدراسة :** هذه الدراسة المقطعية تمت بخمس مستشفيات ولائية خلال عام 2003. كل حالات الملاريا التي أدخلت المستشفى أو مرافقيهم تم معاينتهم بواسطة طبيب من كل مستشفى مستخدمين استبياناً جرى تشفيره وتجريبه مسبقاً.

**نتائج الدارسة :** عدد المرضى الذين تمت معاينتهم بلغ 482 مريضاً. الإنـاث شكلن 62.9% منهم. 75% من المرضـى تقريباً متفهمين أن للملاريـا مضـاعفات خطيرة وقد ذكر 115 (32.0%) منهم فقر الـدم. وجـد أن 418 (86.7%) من المرضى سعوا للعلاج من العاملين الصحيين إلا أن 305 (73.0%) منهم فعل ذلك بعد 24 ساعة من ظهور المرض. بعد المسافة، انعدام المال، عدم وجود مواصلات أو كلها مجتمعة ذكرت كأسباب منعت المرضى من الذهاب إلى المستشفيات. أكثر من 70% تلقوا مضادات الملاريا قبل دخول المستشفى مع تفضيلهم للكلوركين في شكل حقن. مزيداً من التحليل العميق اثبت أن "تكاليف المعالجة" و"عدم الذهاب للعاملين الصحيين" هي العوامل المهمة في عدم طلب العلاج مبكرا.

**التوصيات :** هذه الدراسة أثبتت أن تأخر الوصول إلى المستشفيات ظاهرة بوسط السودان. من بين ما ذكر من أسباب لذلك فإن تكاليف العلاج تعتبر الأهم عند المرضى.

**الكلمات المرجعية:** الملاريا، المفاهيم والممارسات، محددات الاستشارة المتأخرة.

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***Purpose:*** *To develop effective measures of reducing the proportion of severe malaria presentation and deaths attributed to malaria, an adequate understanding of beliefs and practices in households and at the level of primary health care is necessary. The objectives of this paper are to explore beliefs and practices related to the management of severe malaria, and to identify barriers to early consultation.*

***Subjects and Methods:*** *A cross-sectional hospital-based study was conducted in five hospitals in Sudan in 2003. All malaria cases admitted, or their care givers were interviewed by a medical doctor using pre-coded and pre-tested questionnaire.*

***Results:*** *Enrolled in this study, were a total of 482 patients, 62.9% of whom were female. Almost 75.0% of the respondents perceived that malaria had serious complications. Anaemia as a complication was mentioned by 115 (32.0%) respondents. A total of 418 (86.7%) patients sought advice from health personnel. Of these, 305 (73.0%) did so more than 24 hours after the onset of the illness. Distance, lack of money, unavailability of transportation or all were the reasons mentioned as barriers to seeking care at hospitals. More than 70.0% of the patients received anti-malarial drugs before admission with a clear preference for the injectable form of chloroquine. Multivariate analysis revealed that "cost of services" and "not seeking help from health personnel" were the determinants for late consultation.*

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***Conclusion:*** *The study revealed that late consultation was a feature in many parts of Sudan. Among the barriers mentioned by the respondents, the cost of services was of the greatest concern.*

***Key Words****: Severe malaria, believes and practices, determinants of late consultation*

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## INTRODUCTION

Malaria is a leading cause of morbidity and mortality in Sudan. It is estimated that there are 7.5-10 million cases each year with 35-40 thousands deaths.[1] This represents 50% and 70% of WHO Eastern Mediterranean Region cases and deaths, respectively.[2] Although not all deaths were confirmed as malaria deaths, higher case fatality rates were reported at the hospital level reaching 30% in some of the hospitals (Roll Back Malaria (RBM) pre-implementation survey: personal communication). Malaria also accounted for 37% of all maternal deaths in Sudan.[3]

Severe malaria usually develops as a result of delay in treating uncomplicated falciparum malaria. In children, severe malaria may develop very rapidly. Early recognition and prompt treatment of uncomplicated falciparum malaria are of vital importance as the clinical picture may deteriorate at an alarming rate often with fatal consequences.[4,5] To develop effective measures for reducing malaria morbidity and mortality at all levels, it is essential to have an adequate understanding of practices in households and at the primary health care level.

Apart from the fact that the majority of Sudanese live in hypo-to-meso-endemic areas,[6] to which relatively low immunity among the young is attributed,[7] poor case management at the peripheral level,[8] late presentation, preference for the use of injectable chloroquine,[9] use of traditional medicine[10] and the community's perception of the disease[11] were the factors contributing to the development of severe forms of malaria and deaths.

A hospital-based project to reduce malaria mortality in hospitals (run by the national malaria control programme (NMCP) with support from WHO), was launched in 2002. The project in each hospital started with a focus group discussion (FGD) with medical doctors, nurses and other staff who deal with severe malaria cases in hospitals. This FGD was usually guided by a team from the NMCP to try to find an answer to a basic question "why patients died in hospital?" Then a mortality committee was assigned to deal with the determinants of mortality. As part of the project, supplies and materials were provided by the NMCP to hospitals. As indicated by medical doctors during FGDs, patients died in hospital because of poor management at the peripheral level and late presentation to hospital. As part of this project, this study was conducted in order to explore beliefs and practices related to the management of severe malaria and to identify barriers to early consultation.

## METHODOLOGY

This cross-sectional hospital-based study was carried out in Sudan from September 2003 to February 2004. Five hospitals (Figure 1) were selected for the study since they formed part of "the reduction of malaria mortality project". Malaria transmission in the area is hypo-to-meso-endemic with marked seasonality.[1,7]
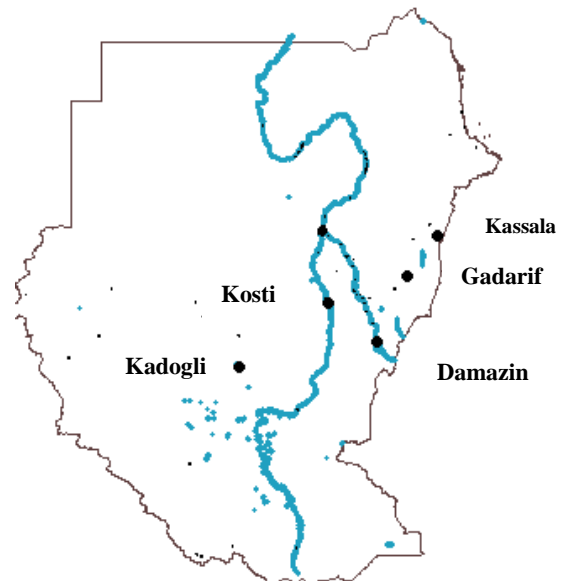


***Figure 1****: Map of Sudan with study sites*

All patients admitted with severe malaria (diagnosed on having one or more of the clinical or laboratory criteria set by WHO[5]) during the

study period constituted the study population. Patients were included in the study regardless of gender or age. The sample size was calculated as 400 candidates using the cross-sectional survey formula ($n=PQZ^2/d^2$ where (n) is the sample size, the confidence level (Z) is taken as two at 95% confidence interval (CI) and the degree of precision (d) is equal to 0.05. Assuming that 50% of patients have good practice in relation to malaria treatment: (P) will be 0.50, and (Q) will be 0.50). As these areas had similar epidemiological situations, the calculated sample was divided equally, so 80 patients at least were requested from each hospital.

Data was collected using a pre-coded and pre-tested questionnaire which composed closed-ended questions on patient personal data, initial response after illness, barriers to early consultations, previous medications, knowledge about the complications of malaria and finally perception about the cost and services provided. In each hospital, the study team nominated a medical doctor to collect the data. He was trained on how to collect the data using the questionnaire. He was also asked to respond to 5-10 questionnaires in their presence. The team spent at least two days with each doctor to be sure that the questionnaire was filled as required. The data collector at each hospital obtained a consent from each patient or care-giver separately before completing the questionnaire.

Data analysis was done using SPSS version 10.0 computer software. Tables were used where appropriate to present the data. Multivariate binary logistic regression was used and the difference between variables was considered significant at p-value <0.05.

**RESULTS**
This study was conducted in 5 teaching hospitals: Kadogli (West Sudan), Kosti and Damazin (central Sudan) and Gadarif and Kassala (East Sudan). A total of 482 respondents were interviewed, 303 (62.9%) of whom were females. Findings are presented in 4 separate sections: knowledge about malaria complications, actions taken before admission, treatment before admission and the perception about services provided in hospital in terms of quality and cost.

Almost three quarters of the respondents perceived that malaria had serious complications.

Anaemia was identified as one of the complications by 115 (32.0%) of the respondents. Fatigue, convulsions, dehydration, loss of consciousness, jaundice and abortion were also mentioned but with less frequency. As presented in Table 1, the majority of patients (73.2%) presented to hospital when their condition was deteriorating and a minority (5%) presented on the advice of their relatives, whereas, only 21.8% were referred to hospital by primary health care personnel.

**Table 1**: *Respondents' knowledge about malaria complications and reasons for coming to hospitals*

| Knowledge and reasons | No. (%) |
| --- | --- |
| Malaria has complications (n=482): | |
| Yes | 359 (74.5) |
| No | 106 (22.0) |
| Don't know | 17 (3.5) |
| Perceived malaria complications (n=359): | |
| Anemia | 115 (32.0) |
| Fatigue | 60 (16.7) |
| Convulsions | 44 (12.3) |
| Dehydration | 33 (9.2) |
| Loss of consciousness | 28 (7.8) |
| Jaundice | 18 (5.0) |
| Abortion | 1 (0.3) |
| Don't know | 60 (16.7) |
| Reasons for coming to hospitals (n=482): | |
| Condition becoming worse | 353 (73.2) |
| Referred by health personnel | 105 (21.8) |
| Advice from relatives | 24 (5.0) |

Delay of treatment was associated with living in Damazin (63.3%), Kassala (54.8%) and Gadarif (46.4%) areas (p-value=0.000). However, respondents' knowledge about malaria complications was high in all areas (75.0-98.1%) with the exception of Gadarif (21.8%) with a significant difference (p-value=0.000). Out of 482 respondents interviewed, 418 (86.7%) sought advice from health personnel, 43 (8.9%) reported self-medication and very few consulted traditional healers. The majority (73.0%) sought advice more than 24 hours after the onset of the fever. One hundred fifty six (32.4%) patients had difficulty in reaching the hospital. Non-attendance at hospitals included distance (41.7%), lack of money (33.3%), lack of transport (17.3%) and all of these by 12 (7.7%) patients (Table 2).

A total of 356 (73.9%) patients reported receiving medicines before admission. Antimalarial drugs were the commonest (97.5%) and chloroquine was the most used as 297

*Table 2: Actions taken by the patient when he gets ill, time after which patient seek advice and barriers and difficulties facing him*

| Variable | No. (%) |
|---|---|
| Action taken when get ill (n=482): | |
|   Seeks advice from health personnel | 418 (86.7) |
|   Goes directly to the lab | 7 (1.5) |
|   Self medication | 43 (8.9) |
|   Seeks advice from traditional healers | 14 (2.9) |
| Barriers to seek advice from health personnel (n=64): | |
|   Lack of money | 13 (20.3) |
|   Far distance to health factility | 24 (37.5) |
|   Prefer home treatment | 27 (42.2) |
| Time after which the patients seeks advice from health personnel for his current illness (n=482): | |
|   <12 hours | 45 (10.7) |
|   12-24 hours | 68 (16.3) |
|   >24 hours | 305 (73.0) |
| There was difficulty to reach the hospital (n=482): | |
|   Yes | 156 (32.4) |
|   No | 326 (67.6) |
| Barriers to come early to hospital (n=156): | |
|   Far distance | 65 (41.7) |
|   Lack of money | 52 (33.3) |
|   No transport | 27 (17.3) |
|   All together | 12 (7.7) |

*Table 3: Treatment before admission to hospitals and respondents opinion about route of administration*

| Variable | No. (%) |
|---|---|
| Medicines received before admission (n=482): | |
|   Antimalarial alone or with others | 347 (72.0) |
|   Antibiotics | 6 (1.2) |
|   Others | 3 (0.6) |
|   No drug received | 126 (26.2) |
| Types of antimalarial received (n=347): | |
|   Chloroquine | 297 (85.6) |
|   Sulfadoxine-pyrimethamine | 30 (8.6) |
|   Quinine | 10 (2.9) |
|   Others | 10 (2.9) |
| Drugs taken as prescribed (n=356): | |
|   Yes | 309 (86.8) |
|   No | 47 (13.2) |
| Preferable route of antimalarial drugs (n=482): | |
|   Injections (IM or IV) | 280 (58.1) |
|   Tabs or syrup | 161 (33.4) |
|   Does not matter | 41 (8.5) |
| Reasons for preferring this route or that (n=441): | |
|   *Injections:* | |
|   Give quick cure | 185 (41.9) |
|   Have less side effects | 9 (2.1) |
|   *Tablets:* | |
|   Give quick cure | 35 (7.9) |
|   Easy to take | 122 (27.7) |
|   Have no effect | 42 (9.5) |
|   Have less side effects | 48 (10.9) |
| Patients received quinine before: | |
|   Yes | 143 (29.7) |
|   No | 339 (70.3) |
| Reasons for not receiving quinine before (n=339): | |
|   Not prescribed for him | 322 (94.9) |
|   Refused to take (side effects) | 17 (5.1) |

(85.6%) patients received it before hospitalization. The majority took drugs as prescribed (86.8%). Patients preferred injectable forms of drugs (58.1%) with the perceived reason that "injections give quick results" (Table 3). The majority (94.4%) of patients agreed that they could have taken quinine if it had been prescribed for them. As reflected in Table 4, patients perceived the quality of service at the hospital level as excellent or good or at least not bad. Only 15 (3.1%) thought that the services were bad. Three hundred and sixty seven (76.1%) stated that although the services provided were of acceptable quality, they were too expensive.

A multivariate binary logistic regression analysis was carried out to identify determinants for late presentation (consultation later than 24 hours from the onset of illness). Five key independent variables were targeted, including gender, age group, reasons for coming to hospital, immediate action taken after getting ill and service cost at hospital level. As shown in Table 4, seeking care from a source other than health personnel (OR =0.20, 95 CI: 0.08, 0.58) and service cost perceived as expensive (OR =0.53, 95 CI: 0.33, 0.89) were the determinants for late

*Table 4: Binary logistic regression analysis looking for determinants for late consultation (seeking care after 24 hours) (n=482)*

| Determinants | OR | 95% CI | p-value |
|---|---|---|---|
| Age of the patient: | | | |
|   <5 years | 1 | | |
|   5 years and above | 0.86 | 0.51,1.46 | 0.58 |
| Gender of patient: | | | |
|   Male | 1 | | |
|   Female | 1.26 | 0.78,2.04 | 0.35 |
| Patients brought to hospital because condition worse: | | | |
|   Yes | 1 | | |
|   No | 0.69 | 0.41,1.18 | 0.18 |
| Patient not seeking help from health personnel: | | | |
|   Yes | 1 | | |
|   No | 0.21 | 0.08,0.56 | 0.00 |
| Service cost at hospital is expensive: | | | |
|   Yes | 1 | | |
|   No | 0.47 | 0.30,0.75 | 0.000 |

consultation. No relation was found with gender, age group or the reasons for coming to hospital.

## DISCUSSION

Early recognition by patients and care-givers of severe malaria symptoms and signs and danger signs is of paramount importance for seeking early assistance and reducing deaths attributed to malaria. However, early recognition depends on the knowledge and perception of the patients and care givers about malaria. In the present study, the majority (74.5%) of respondents recognized that malaria had complications. Approximately one third of the respondents mentioned anaemia as one of the complications. The other most serious complications (convulsions, loss of consciousness and jaundice) were mentioned by few respondents. Poor knowledge and the perception of malaria as a "routine illness" had been reported in studies carried out in Tanzania[7] and in Sri Lanka.[12]

The finding that 418 (86.7%) of the patients sought advice from health personnel during their present illness is similar to reports of other studies.[13] Moreover, 305 (73.0%) sought advice more than 24 hours after the onset of illness. Furthermore, a total of 353 (73.2%) of the admitted cases stated that the reason for coming to hospital was that "their condition was becoming worse". Distance, lack of money and the preference for home treatment were the reasons mentioned. This is in accordance with other studies in which seeking treatment was found to be associated with accessibility and the severity of the disease.[15] Focus group discussion with care providers (personal communication) conducted as part of the mortality project revealed that poor case management of uncomplicated malaria at primary health level was common.

Antimalarial drugs were prescribed before admission to 347 (72.0%) patients, 297 (85.6%) of whom received chloroquine. Unfortunately, their conditions worsened. Data provided by this study agree with providers' opinions and may indicate the low efficacy of chloroquine. This confirms previous findings reported in Sudan.[16,17] The other fact related to case management at the primary health care level was that people preferred injectable form (58.1%) rather than tablets. Chloroquine injections are "more effective" and "give quick response" were reasons mentioned

here and by other authors[18]. Very few respondents in this study (5.1%) had bad ideas about quinine.

Late consultation was a feature in malaria treatment in Sudan. Among the many reasons stated by respondents, the cost of services was a real barrier. This emerged when the respondents were asked about the reasons for not consulting health personnel directly and when they were asked about the quality and cost of services at hospital level. As the majority of patients received chloroquine before admission, it may be difficult to overlook its role in presentation with severe forms of malaria as a result of its low efficacy. However, as stated by the health personnel poor case management at the primary health care level could be the major factor. Feasible solutions in such situations are the provision of services at an affordable cost as close to home as possible and the training of personnel at the primary level so that cases could be better managed. A community-based communication programme targeting key beliefs and practices that prevent patients from early consultation are necessary.

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