

Impact of the national protocol for malaria treatment on prescribing patterns in Gezira state, Sudan

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أثر البروتوكول الوطني لمعالجة الملاريا في نماذج وصف الأدوية في ولاية الجزيرة - السودان
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الخلاصة: أجريت دراسة مستعرضة لتقييم أثر البروتوكول الوطني لمعالجة الملاريا على طرق معالجة الملاريا، وذلك في ولاية الجزيرة في وسط السودان، عام 2001. وتبين أن معظم الأطباء المقتة والخمسة والسنتين ومساعدتهم، الذين أجريت المقابلات معهم (وهم يشكلون 80% من العدد الكلي) لم يتلقوا تدريباً على استعمال البروتوكول، وكثير منهم (57.5%) لا يزال كل منهم متمسكاً ببروتوكول خاص به. وقد أوضح التحليل لـ 410 من الوصفات أن الكلوروكين هو أكثر الأدوية المضادة للملاريا شيوعاً (69.5% من الوصفات). وعندما قورنت هذه الدراسة مع دراسة سبق أن أجريت قبل استخدام البروتوكول، تبين أن كثيراً من الوصفات تحقق معايير البروتوكول من حيث الاستخدام الصحيح للكلوروكين، في حين أن النظام العلاجي لإعطاء الكينين حقناً وريدياً لا يزال غير كاف. وقد أوضحت الدراسة فقد الإشراف المستمر والتدريب والمتابعة حول تطبيق الدلائل الإرشادية للبروتوكول فضلاً عن بعض المواقف السلبية من بعض الاختصاصيين العاملين في المستشفيات إزاء هذا البروتوكول.

ABSTRACT A cross-sectional study to assess the impact of the national protocol for malaria treatment was conducted in a town in Gezira state, central Sudan, in 2001. Most of the 165 doctors and medical assistants interviewed (80.0%) had not been trained in the protocol and many (57.5%) were still using their own protocols. Analysis of 410 prescriptions showed chloroquine was the most common antimalarial drug used (69.5% of prescriptions). Compared with a study before implementation of the protocol, more prescriptions met the protocol standards for correct chloroquine dose, whereas regimens for administration of intravenous quinine were still inadequate. The study showed a lack of continuous supervision, training and follow-up in the protocol guidelines and negative attitudes of hospital specialists towards the protocol.

Impact du protocole national de traitement du paludisme sur les modes de prescription dans l'État de Gezira (Soudan)

RÉSUMÉ Une étude transversale a été réalisée dans une ville de l'État de Gezira (Soudan central) en 2001 afin d'évaluer l'impact du protocole national pour le traitement du paludisme. La plupart des 165 médecins et auxiliaires médicaux interrogés (80,0 %) n'avaient pas été formés à l'utilisation du protocole et beaucoup (57,5 %) utilisaient toujours leur propre protocole. L'analyse de 410 ordonnances a montré que la chloroquine était l'antipaludique le plus couramment utilisé (69,5 % des ordonnances). Par rapport à une étude effectuée avant l'application du protocole, un plus grand nombre d'ordonnances se conformaient aux normes du protocole concernant la dose correcte de chloroquine, alors que les schémas d'administration de quinine par voie intraveineuse demeuraient inappropriés. L'étude a montré un manque de supervision continue, de formation et de suivi pour les directives du protocole et des attitudes négatives des spécialistes hospitaliers vis-à-vis du protocole.

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Introduction

Sudan has contributed to and endorsed the World Health Organization (WHO) global strategy for malaria control and 'Roll back malaria'. It has been observed that, unless diagnosed and treated promptly, patients with malaria deteriorate rapidly and the outcome is grave; hence plans to formulate a national protocol for the treatment of malaria were a priority in Sudan [1]. The national protocol is a set of recommendations and regulations concerning antimalarial drugs and their utilization in a country. It defines the national malaria control policy and forms part of the national drug policy, which expresses and prioritizes the medium- to long-term goals set by the government for the pharmaceutical sector. The national drug policy is both a commitment to a goal and a guide for action, identifying the main strategies for attaining them, and providing a framework within which the activities of the pharmaceutical sector can be coordinated [2].

The idea of formulating an antimalarial drug policy was encouraged in Sudan through a coordinated effort between the Directorate of Malaria, the Federal Ministry of Health and WHO. A preliminary workshop of consultants was held in the Faculty of Medicine, University of Gezira, in April 1998, followed by a national committee in June 1998, which finalized the policy under evaluation [1].

A study of antimalarial drug prescribing patterns was carried out in Wad Medani town in Gezira state before the implementation of the protocol in 1999 [3]. The study showed poor standards of prescribing of antimalarial drugs, in terms of over-prescribing of chloroquine tablets and incorrect regimens for intravenous administration of quinine. The same study revealed that most of the medical practitioners tend-

ed to follow their own regimens to treat malaria infection.

The present study is the first attempt to measure the influence of the national protocol on prescribing patterns in the same area. It is important to make an evaluation of knowledge, attitudes and practices of health providers towards the national protocol, so that unintended consequences or constraints can be identified and successful interventions and strategies reinforced.

Methods

This cross-sectional study was carried out in Wad Medani, a town situated in Gezira state in central Sudan. The study was conducted in October, the month in which a normal rise of malaria infection is annually observed.

The research process consisted of 3 steps. The first step was an interview with the state director of the malaria control programme. In the second step, we contacted all 181 doctors and medical assistants (from both public and private sectors) who were providing medical services in the town; 165 were available for interview. Questions were asked to assess their knowledge, attitudes and practices relating to the national protocol. In the third step, a sample of 6 pharmacies was selected using stratified random sampling from 3 strata. Over 3 consecutive days, 410 prescriptions from both general practitioners and hospital outpatients departments were collected and a pre-tested checklist was filled in to assess their conformity to the protocol standards of drug dosage, frequency of administration, etc.

Standard treatment regimens at that time according to the Malaria Administration Department of the Federal Ministry of Health were as follows.

- First line treatment for simple malaria: chloroquine oral 25 mg/kg over 3 days. For chloroquine injection of adults: 1 ampoule (200 mg base) followed by 1 ampoule after 6 hours then 2 times per day (12 hours apart) for a total of 7 injections. For chloroquine injection of children: 2.5–3.5 mg/kg.
- Second line treatment: pyrimethamine-sulfadoxine, 25/500 mg. For adults: 3 tablets at once. For children: according to weight.
- Third line treatment: mefloquine or quinine.

The data were tabulated and analysed using SPSS.

Results

Interview with state director

The interview with the state director of the malaria control programme revealed that 6 training courses had been conducted for 145 doctors and medical assistants over a 2-year period. The 3-day training sessions, which were run at 2 different centres, covered the epidemiology, clinical picture and treatment of malaria according to the national protocol guidelines. The protocol guidelines had been distributed to all health workers after training, but neither continuous supervision nor surveys to assess the implementation of the protocol had been carried out by the malaria control programme.

Interviews with health workers

Overall, the majority of the 165 health workers interviewed (132, 80.0%) reported that they had not received training about the national protocol guidelines. None of the 58 house officers or 25 consultants had been trained. No training had been received by 88.8% of hospital registrars, 64.0% of

medical assistants or 52.0% of general practitioners. A significant difference was observed in the training status among different categories of health worker (Table 1).

With regard to the level of awareness of the protocol, around two-thirds of the health workers (107, 64.8%) were aware of the guidelines. Hospital house officers had the lowest level of awareness (37.9%). The difference was significant across different categories of health worker (Table 1). Regarding the availability of the guidelines, only 5 health workers (3.0%) reported having it in their clinic at the time of the study.

Adherence to the protocol was checked by asking the health workers what regimens they used for the treatment of simple malaria and complicated malaria compared to the standard regimens recommended by the Malaria Administration at the Ministry of Health. Despite the relatively high rate of awareness, just over half of the interviewed health workers (95, 57.5%) showed no adherence to the protocol, with a significant difference between the different categories (Table 1). When asked about reasons for not adhering to the protocol guidelines, one-third of health workers mentioned lack of awareness of them (Table 2). Among the senior hospital staff, however, it was due to negative attitudes towards the protocol, since 72.0% of consultants and 100% of registrars claimed that the protocol was ineffective. Some health workers (11.5%) said that they did not adhere to the guidelines in order to satisfy patients.

When evaluating the impact of the training on the adherence to the protocol guidelines a significant difference was observed. The 33 trained staff were more likely to adhere to the protocol (60.6% adhering) than the 132 untrained staff (only 37.9% adhering) ($\chi^2 = 4.691$, $P < 0.05$).

Table 1 Training in, awareness of and adherence to the guidelines of the Sudan national protocol of malaria treatment according to type of health worker

Variable	Medical assistants (n = 25)		GPs (n = 48)		House officers (n = 58)		Registrars (n = 9)		Consultants (n = 25)		Total (n = 165)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Trained about guidelines	9	36.0	23	48.0	0	0	1	11.2	0	0	33	20.0
Not trained about guidelines	16	64.0	25	52.0	58	100.0	8	88.8	25	100.0	132	80.0
$\chi^2 = 48.58, P < 0.01$												
Aware of protocol	18	72.0	36	75.0	22	37.9	9	100.0	22	88.0	107	64.8
Not aware of protocol	7	28.0	12	25.0	36	62.1	0	0	3	12.0	58	35.2
$\chi^2 = 31.92, P < 0.01$												
Adhering to protocol	10	40.0	30	62.5	19	32.8	4	44.4	7	28.0	70	42.4
Not adhering to protocol	15	60.0	18	37.5	39	67.2	5	55.6	18	72.0	95	57.5
$\chi^2 = 12.34, P = 0.015$												

n = total number of respondents.
GPs = general practitioners.

Table 2 Reasons given by the health workers for not adhering to the guidelines of the national protocol of malaria treatment (those adhering gave hypothetical answers)

Variable	Medical assistants (n = 25)		GPs (n = 48)		House officers (n = 58)		Registrars (n = 9)		Consultants (n = 25)		Total (n = 165)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Lack of awareness of protocol	10	40.0	16	33.3	30	51.7	0	0	0	0	56	33.9
Believe protocol ineffective	5	20.0	24	50.0	19	32.8	9	100.0	18	72.0	75	45.5
Better patient satisfaction	4	16.0	8	16.7	7	12.1	0	0	0	0	19	11.5
Others	6	24.0	0	0	2	3.4	0	0	7	28.0	15	9.1

n = total number of respondents.
GPs = general practitioners.

Prescription analysis

Out of 410 prescriptions, 128 were for antimalarial drugs (31.2%). Most (91) were written by general practitioners, 11 by medical assistants, and 26 by consultants. Overall, 102 (79.7%) of antimalarial drug prescriptions were judged to be adequate in terms of correct dosage according to the protocol. No significant difference was observed between different specialties regarding correct dosage; 80.2% of prescriptions from GPs followed the protocol, 72.2% from medical assistants and 80.8% from consultants.

Chloroquine was the most commonly prescribed antimalarial drug (89 prescriptions, 69.5%), followed by quinine (22, 17.2%), pyrimethamine-sulfadoxine (13, 10.2%), artemether (2, 1.6%), halofantrine (1, 0.8%) and primaquine (1, 0.8%).

The proportion of antimalarial drug prescriptions that correctly complied with the protocol recommendations showed that intramuscular quinine was the formulation most often prescribed incorrectly (4 out of 9 prescriptions, 30.8%). One-fifth of prescriptions (5 out of 25, 19.2%) for chloroquine oral tablets were incorrect, generally for more than the recommended 10 tablets. Conversely, many prescriptions for intravenous chloroquine prescribed too few ampoules (15 out of 56 prescriptions, 26.8%), as many doctors were still following the former recommendations for 5 ampoules instead of 7 ampoules in the 1999 protocol guidelines. The poor compliance with protocol guidelines for quinine oral tablets (2 out 8 prescriptions incorrect, 25.0%) was mostly due to dispensing too few tablets.

Discussion

The implementation of a national drug policy faces several constraints, such as the

logistics of distribution, the large number and variety of people and institutions involved and the rising cost of treatment [4]. Appropriate planning is therefore essential for successful implementation. In this study, some constraints and problems were highlighted which reflect on the implementation of the protocol for national malaria control in Sudan.

The study has revealed the impact of training on adherence to the protocol guidelines, which highlights the importance of continuous in-service training. Although the house officers constituted the majority of health providers, they were not targeted in the training process. This was obvious from the level of non-adherence to the protocol. It might be necessary to introduce the protocol in the pre-service training.

The great majority of health workers did not have the protocol guidelines in their clinic at the time of the study, reflecting a lack of continuous supervision and follow-up of the protocol.

Lack of awareness was an important reason for the non-adherence in the majority of the health workers and this can be mostly attributed to the rapid turnover of health workers. Patient satisfaction was another reason for non-adherence to the protocol by some categories of health worker, suggesting that education of the community about the malaria treatment protocol would also be of value.

Although awareness of the protocol was high among consultants, they were not adhering well to the protocol. Poor attitudes of senior staff are a concern as they may be an influence on junior staff, especially house officers being trained. The consultants justified their non-compliance in the belief that the protocol was not effective due to the appearance of chloroquine-resistant malaria in the area. The resistance to chloroquine has been studied

in Sudan by Abdel-Hamid et al., who concluded that chloroquine-resistant malaria was more than 25% in 4 sentinel posts [5]. Another recent study in the same area in the year 2000 revealed that 38% of *Plasmodium falciparum* were resistant to chloroquine [S.A. Faragalla, unpublished report, 2002]. Thus, monitoring and updating of the protocol is highly necessary.

The study revealed that the majority of prescriptions (70.0%) were written by general practitioners, thus highlighting the importance of targeting them in future interventions. This is the routine practice in the Sudan malaria control programme, according to the director of the programme; however the continuous turnover of general practitioners has had a negative impact on the effectiveness of training.

The rate of prescriptions for antimalarial drugs as a proportion of all prescriptions in this study (31.2%) was similar to the national figure (30.0%) [6]. Chloroquine was the most commonly prescribed antimalarial drug (69.5%), as in the previous study (52.2%) [3]. Warrel observed that despite the extensive spread of *P. falciparum* resistant strains, chloroquine is still the most widely used antimalarial drug in the world [7] as it is readily available and comparatively cheap [8]. Two antimalarial drugs re-

cently launched in Sudan, artemether and halofantrine, appeared on prescriptions in this study although they should be reserved for complicated malaria cases (which are treated as hospital inpatients) as recommended by the protocol.

The proportion of antimalarial drug prescriptions that were compliant with the protocol (79.7%) reflects a marked improvement compared with the study before the implementation of the protocol (33.3%) [3]. However, regimens for administration of intravenous quinine were still inadequate in 30% of cases and this should be stressed in future interventions.

We recommend the following: monitoring and updating of the protocol; introducing the protocol guidelines in pre-service training; and thorough distribution of the protocol guidelines to health workers, with close follow-up and supervision.

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Funds and technical support are available: however, malaria is still a serious challenge in the Region

Dr Hussein Gezairy, WHO Regional Director for the Eastern Mediterranean, called upon governments and the private sector in the most countries affected by malaria to ensure that safe and effective drugs are made affordable and accessible to patients, and that the implementation of available vector control tools is through intersectoral action for health – including community-based initiatives and outreach health services.

The Regional Director pointed out that malaria is still a serious problem in the Eastern Mediterranean Region, with more than 15 million estimated cases every year and five of the worst-affected countries in the world, namely Afghanistan, Djibouti, Somalia, Sudan and Yemen. The Region still faces a serious malaria challenge to which the Regional Office is responding in many ways.

Source: WHO/EMRO Press release No. 7
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