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The quality of sulfadoxine–pyrimethamine prescriptions, counselling and drug-dispensing practices, for children in Kenya

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Prescription of the correct treatment, the adequate counselling of patients, and adequate drug dispensing are some of the critical steps in the provision of effective malaria-case management (WHO, 2000). Unfortunately, health workers frequently do not follow evidence-based guidelines when deciding which antimalarial drug to prescribe (Herman, 1999; Rowe *et al.*, 2000, 2003), and prescriptions with incorrect dosages are common for multi-dose regimens such as those of chloroquine (Ofori-Adjei and Arhinful, 1996; Font *et al.*, 2001). In theory at least, single-dose regimens, such as those of sulfadoxine–pyrimethamine (SP), should be relatively easy to prescribe correctly and administer adequately and therefore have the potential to maximize the effectiveness of treatment.

In 1998 the Kenyan Ministry of Health officially changed its policy for the first-line treatment of uncomplicated malaria, from chloroquine to SP (Shretta *et al.*, 2000). The new policy was reflected in a guideline for health workers produced by the Kenyan National Malaria Control Program (NMCP; Anon., 1998). Given its advantages — low cost, high safety profile, single-dose regimen, and (expected) simple and effective administration at the health-facility level — SP was considered an ideal option for Kenya's resource-constrained facilities. The aims of the present study were to explore the quality of SP prescriptions and the associated counselling and drug-dispensing practices, 3 years after SP replaced chloroquine as the recommended first-line treatment.

Between 2001 and 2002, surveys of the outpatient case-management practices of health workers, for paediatric cases of malaria, were undertaken at 81 government health facilities in the Kenyan districts of Kisii, Kwale, Bondo and Makueni. The results of the more complex aspects of the treatment quality for uncomplicated malaria and a detailed

explanation of the survey methods have already been published elsewhere (Zurovac *et al.*, 2004). In brief, the study design was a cross-sectional, stratified, cluster-sample, health-facility survey, with 142 health workers assessed as they undertook a total of 1864 sick-child consultations. Data on the clinical practices, including counselling and drug dispensing, were collected during observations of the consultations. During each 'exit' interview, information on the medications prescribed was collected from the patient-held records, the child's age was established, and any drug-dispensing and counselling practices performed outside of the consultation room were recorded, after direct questioning of the caregiver.

For the present analysis, the focus was on the quality of the health workers' SP prescriptions and their associated counselling and SP-dispensing practices, irrespective of the appropriateness of the treatment. The quality of the SP prescriptions was defined as 'as recommended', 'below recommended' or 'above recommended', using the age-specific SP dosage tables from the NMCP's guideline as the gold standard. The guideline recommends single doses of a quarter, half and three-quarters of a SP tablet and a full tablet for children aged <3, 3–11, 12–47 and 48–59 months, respectively. The results for the four study districts were combined and analysed using the Stata 8 software package (Stata Corporation, College Station, TX).

SP was available in all but one of the 81 health facilities investigated. Overall, at 76 facilities, 122 health workers prescribed SP for 1014 sick children. Only 17 (1.5%) of the patients prescribed SP were referred for hospitalization. The ages of most (92.2%) of the 1014 children prescribed SP were determined but only 574 (55.4%) of them were weighed. Most (85%) of the SP prescriptions were in tablet form; 157 (13%) were liquid preparations and 17 (2.0%) prescriptions did not have a drug formulation specified. Most of the prescriptions were single-dose regimens but 50 (4.9%) included prescriptions for use over 2 days. For only 34% of the prescriptions was the dosage of SP tablets consistent with the NMCP's recommendations, and, of particular concern, SP was prescribed below the recommended dose for 21.5% of the children (see Table). Furthermore, 44.5% of prescriptions were above the recommended dose. Children aged 12–47 months were much more likely to be prescribed lower-than-recommended doses of SP (30.3%) than those aged 3–11 (11.4%) or 47–59 months (7.3%).

Of the 997 children who had SP prescribed for outpatient use, only 133 [10.7%, with a 95% confidence interval (CI) of 5.5%–15.8%] received their dose while at the facility, only 125 (10.2%; CI = 5.2%–15.3%) were observed swallowing the treatment, and only 21 (2.5%; CI = 0.6%–4.4%) left the facility with advice on what to do in case of vomiting. Advice about clinical conditions requiring immediate return to the facility, such as the child becoming more ill or being unable to drink, was provided to the caregivers of only 80 children (7.2%; CI = 3.1%–11.3%), and any kind of follow-up was discussed in only 144 (15.3%; CI = 10.1%–20.5%) of the consultations. Clinicians only advised the caregivers of 123 (19.1%; CI = 8.2%–29.9%) of the 864 children who did not receive SP while at the health facility how to give SP to their children, but health workers other than the attending clinicians routinely performed this task. A pharmacist or a drug dispenser instructed 809 caregivers (94.5%; CI = 91.2%–97.9%) on how to give SP to a child at home.

Contrary to the common view that a single-dose regimen of SP guarantees optimal effectiveness, the present results demonstrate a high frequency of low-dose prescriptions (22%) and this is likely to reduce treatment success. The situation is probably worse than illustrated here because the relevant NMCP guideline is itself deficient. In western Kenya, using weight of the child as the gold standard, Terlouw *et al.* (2003) recently demonstrated that adherence to the NMCP's recommended, age-specific dosages of SP results in 12% of children being under-dosed (i.e. they receive <25 mg sulfadoxine/kg and <1.25 mg

pyrimethamine/kg). This weakness of the guideline, combined with the many prescribed doses that fall below the level recommended by the guideline, increases the risk of clinical failure and SP resistance.

As counselling plays a critical role within the Integrated Management of Childhood Illnesses (IMCI) training programme, the introduction of this programme to the districts investigated in the present study should improve the quality of counselling. Given the simplicity of the SP regimen, the present observations on drug-dispensing practices were particularly disappointing. In improving the effectiveness of malaria treatment, the dispensing of SP to be taken at home and the failures to administer the single-dose drug under direct observation represent missed opportunities.

The present results highlight several deficiencies, in the practices of health workers, that compromise the effectiveness of malaria-case management. With the frequency of SP-treatment failure increasing (Anon., 2003) and the recent policy shift in Kenya (Anon., 2004) towards the use of more expensive and more complex artemisinin-based combination therapies (ACT), the quality of health workers' prescriptions, counselling and drug dispensing becomes even more important. Guaranteeing adequate funding for ACT may not be enough to achieve optimal effectiveness; additional financial investment is required to improve the use of drugs at the point-of-care.

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TABLE

The numbers of sulfadoxine–pyrimethamine prescriptions that followed the age-specific dosage tables given in the national guideline, or indicated doses that were below or above those recommended in the guideline

Age of child (months)	No. investigated	Recommended dose		Dose below that recommended		Dose above that recommended	
		No. of children	% of children and (CI) *	No. of children	% of children and (CI) *	No. of children	% of children and (CI) *
<3	39	23	54.5(35.0–73.9)	0	0(0)	16	45.5(26.1–65.0)
3–11	214	164	79.0(71.6–86.5)	26	11.4(5.0–17.8)	24	9.6(4.9–14.2)
12–47	475	387	3(3.0–11.6)	148	30.3(19.0–41.5)	289	62.4(50.3–74.6)
47–59	110	66	65.2(54.1–76.3)	10	7.3(1.8–12.7)	34	27.5(16.9–38.1)
<60	838 [†]	291	34.0(29.6–38.4)	184	21.5(13.7–29.2)	363	44.5(36.6–52.4)

* Sampling weights were applied to account for the unequal probability of the selection of facilities. The 95% confidence intervals (CI) were estimated to take account of the cluster-sampling design, all sick-child consultations occurring at a health facility being defined as the primary sampling unit.

[†] Another two prescriptions were recorded but excluded from the analysis because no dosages were specified.