ASSESSING PRESCRIBING AND PATIENT CARE INDICATORS FOR CHILDREN UNDER FIVE YEARS OLD WITH MALARIA AND OTHER DISEASE CONDITIONS IN PUBLIC PRIMARY HEALTH CARE FACILITIES

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Abstract. A prospective descriptive observational study using WHO indicator forms and questionnaire was carried out in Kibaha district public primary health care facilities. We assessed knowledge about drugs in mothers/guardians of sick children under age five years immediately after consulting clinicians and after receiving drugs from the dispenser. The questionnaires had closed- and open-ended questions. Interviews were administered by trained nurses and the authors. The prescribing, dispensing practices, including drug labeling and instructions given to mothers/guardians on how to use drugs at home, in these health facilities which are under the Essential Drugs Program (EDP), was assessed. A total of 652 prescriptions from mothers/guardians with sick children under age five years were observed, recorded and analyzed. Prescribing indicators were used as stipulated by the WHO/DAP/93.1 how to investigate drug use in health facilities. The diagnosis for malaria cases made by the clinicians on average per facility were as follows: malaria alone 25, diarrhea alone 3, pneumonia alone 3, malaria and diarrhea 4 cases, malaria and pneumonia 2 cases and malaria and other conditions 14 cases. The average number of drugs per prescription in these facilities was 2.3 and the percentage generic prescribing was 87.0, antibiotics 30.5, and injections 26.2, with 93.5 % of all prescribed drugs being within the Essential Drugs List (EDL). The overall average dispensing time was 1.4 minutes per patient, of the drugs prescribed, 54.7 % were dispensed, whereas 21.4 % of drugs dispensed to mothers/guardians were adequately labeled, and 37.2 % of mothers knew how to administer drugs correctly to their sick children after receiving the drugs from the dispenser. These results suggest the need for educational intervention for prescribers (health care providers) on rational prescribing of drugs, such as antimalarials, antibiotics, injections, proper dispensing, and adequate labeling drugs in packets, while the dispensing time for drugs was too short. It is necessary to correct these malpractices of irrational prescribing and dispensing drugs for treatment of malaria and other childhood illnesses in public primary health care facilities (PHC). Furthermore, inadequate physical examination and short consultation time needs to be improved. There is a need to advise the Ministry of Health to develop health education programs on a regular basis for all health care providers in the country and mothers/guardians of children in general public/rural communities on how to use/administer antimalarials and other drugs at home. All these can be achieved through well planned health education training programs.

INTRODUCTION

In most public primary health care facilities (PHC) in Tanzania, the treatment of childhood illnesses is based on presumptive diagnosis because of a lack of diagnostic facilities, such as microscopes, and reagents, excessive workload due to patient health care demands and a shortage of competent medical staff. Thus, in these PHC facilities, children presenting with a history of fever are assumed to have malaria and are prescribed antimalarial drugs in various forms, such as tablets, syrups or injections.

In other life threatening illnesses which present with symptoms similar to malaria, such

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as pneumonia, diarrhea and acute respiratory tract infection (ARI), improper diagnosis and treatment can increase morbidity and mortality in this age group. Rational prescribing in these childhood illnesses is therefore a key element in curative care performance, with potential influence on both the efficiency and quality of care. Rational drug use means not only that appropriate drugs are prescribed, but that they are available when needed and at a price people can afford, that they are taken in the right dose, at the right intervals and for the right length of time, and that they are effective, of acceptable quality and safe (Kanji *et al*, 1992).

The introduction of Essential Drugs Programs (EDP) in developing countries, including Tanzania, has sought to address the supply side of rational drug use. The next step in improving rational drug use requires greater focus on prescribing practices and drug use within the community (Foster, 1991, Kanji *et al*, 1992). Relatively few studies have undertaken a wide-ranging examinations of prescribing and patient care practices are as yet available in Tanzania. However, previous studies conducted in the country focused on urban public PHC facilities in Dar-es-Salaam, Tanzania and addressed the issue of knowledge (Massele *et al*, 1993), treatment seeking practices (Massele *et al*, 1993; Mnyika *et al*, 1995) and comparison of generic prescribing between urban public and private health facilities (Massele and Nsimba, 1997; Nsimba *et al*, 2003).

Government PHC facility services include curative and maternal and child health (MCH) care. The health worker in charge is a paramedical, clinical officer or assistant clinical officer and primarily provides basic presumptive diagnosis and treatment services. Other staff, including untrained nurses, are also known to assist in the provision of presumptive diagnosis and treatment services. PHC facilities are theoretically the first place of referral to secondary health facilities in Tanzania.

The aim of this study was to assess health care workers' performance in terms of prescribing practices among health care providers and patient care indicators, including instructions given to mothers and the mother's knowledge of dispensed drugs for their sick children in Kibaha PHC facilities with special reference to the management of major childhood illnesses. The information from these studies could form basis of an intervention program to improve the quality of Integrated Management of Childhood Illnesses (IMCI) in Tanzania.

MATERIALS AND METHODS

Study area

The study was conducted in Kibaha district situated along the coast, 40 kms northwest of Dar-es-Salaam, Tanzania. The district has 9 wards and 41 villages. Administratively, there is the District Administrative Executive Officer, ward secretaries, village chairmen and the ten-cell leaders (popularly known as "balozis" in Swahili). The district has a total of more than 20,000 households with an average household family size of 5 people. According to the National Census of 2002, the district had a total population of 132,045 people (66,291 males and 65,754 females). With a national annual growth rate of 3.2% (NBS, 2002).

Organization of health services in Kibaha district

The district has a total of 30 health facilities, of which 10 were public at the time of the survey. At present, the district has 13 public and 17 privately owned facilities. There is one district designated hospital, two public health centers, 11 public dispensaries and 17 private dispensaries (owned by religious bodies). Most of these facilities are located within Kibaha township and in the small town of Mlandizi, which is about 35 km from Kibaha Town along the Morogoro Road.

The Kibaha designated district hospital is located in the Tumbi area within the Kibaha Education Center area. This hospital serves both as a district and a regional hospital for emergency cases, such as serious road accidents, which happen along the Morogoro road.

Selection of health facilities

The district had a total of 10 public primary health care facilities at the time of the survey, which were all included in the study. The list of

dispensaries was obtained from the district medical officer. Permission to carry out the study was sought from the Ministry of Health (MOH), whereas ethical clearance was granted by Muhimbili University College of Health Sciences ethics Committee.

Assessing prescribing practices

Prospective data from patient prescriptions were obtained by intercepting patients from the prescriber before the dispensing of prescribed medicines. For each prescription, details were taken for location, age at diagnosis and drugs prescribed. Only data from first visits were used in the assessment. The sample size was made according to the WHO manual on how to investigate drug use in health facilities (WHO, 1993a).

However, due to few facilities in the district, instead of using the WHO recommended sample size of a minimum of 20, we decided to increase the sample number of prescriptions per facility from 20 to between 40-60. Thus, a total of 652 mothers/guardians with prescriptions for their sick children were collected, observed and recorded.

Assessment of exit interviews to determine knowledge and cross-check observations of dispensing practice

Prospective data from 652 exit interviews and observations were conducted as mothers/guardians left the health unit, to determine knowledge of dispensed medicines, including labeling and instructions offered to them about the correct/rational use of the drugs.

Selection of mother/guardians of children at the facilities.

Mothers/guardians of sick children under age 5 years who participated in this exercise were randomly selected from mothers/guardians who visited these facilities seeking treatment. The selection was done as follows: mothers/guardians were requested to pick a piece of paper from a box which had hidden numbers.

Those who picked even numbers were requested to give verbal consent to participate in the study at the entry point before seeing the health care providers. There were no refusals from mothers/guardians. Only fresh cases were interviewed once each day at these facilities and no re-attendances were taken or interviewed twice.

Data collection

At health facilities, researchers were escorted by one person who was appointed by the district medical officer for introduction to his or her public health facilities in the district. All health staff in the facilities were briefed as to the aims of the study on arrival at these places. The prescribing practices, number of drugs prescribed, number of drugs dispensed, dispensing time, adequate labeling and instructions/advice given to mothers/guardians by the dispenser on how to use the drugs was observed by looking at the prescriptions.

This survey was carried out by nurses and the two investigators. The nurses were trained as research assistants for one week. The questionnaires were pre-tested prior to the study. The questionnaires were translated into the Tanzanian national language (Swahili) for easy understanding and administered to the mothers. The questionnaires had open and closed ended questions and consisted of identification (name of the mother, child and health facility), demographic characteristics of the mothers and their children age, sex of the mothers/guardians and the children, their education and employment).

Mothers'/guardians' knowledge of the correct dose of the drugs dispensed to her/him immediately after leaving the dispensing window was tested while still having fresh memories. They were asked to show the drugs given to them, which were recorded by the investigators. The prescribing, patient care and facility indicators were all collected and recorded on the (WHO, 1993a) forms.

Diagnosis of the three main childhood conditions at these facilities was assessed by observing the patients' prescriptions after consultation which were then recorded.

Data analysis

The responses to close-ended questions were coded after completion of the study according to the answers which were given by respondents and recorded by researchers. This was done before data entry. The data was entered into the computer and analyzed using EPI-

INFO software. Frequencies and percentages were calculated. For analysis of continuous data and differences between means, a Student' s *t*-test was applied. A p-value of <0.05 was considered to be statistically significant.

Ethical clearance

The study was cleared by the Human Ethics Committee of Muhimbili University College of Health Sciences (MUCHS)-Dar-es-Salaam, Tanzania. Approval to carry out the study was obtained from the Kibaha district and Coast region administrative officials, before the study was conducted.

RESULTS

Clinician prescribing practices

The average number of drugs per encounter was comparable between the two public primary health care facilities (2.3 ± 0.47 SD). There was no statistical difference between the two facilities in the average number of drugs per encounter. Generic prescribing was high (87%) in the public primary health care facilities. Antibiotic prescribing was lower in the public facilities (30%), as were the number of injections prescribed (25.9%) in these facilities. Inter-facility variation existed in prescribing antibiotics and injections. The prescribing of drugs according to the essential drug list of Tanzania was also much higher as the public facilities (Table 1).

The main drugs prescribed were analgesics (81%), chloroquine (71%) and antibiotics (54%). Twenty-four percent of the total number of prescriptions in these public facilities were injections. The proportions of chloroquine and antibiotic injections prescribed varied between health facilities. Other prescriptions included oral rehydration salts (ORS) (7%) and others (40%) such as antihelminthics, benzylbenzoate emulsions, folic acid, multivitamins and cough mixtures. However, the proportions of chloroquine and antibiotic prescribed did not differ between the 10 public primary health care facilities (Table 4). Two percent of the children were prescribed no drugs, 7% were prescribed one drug, 57% were prescribed two drugs and 34% were prescribed three drugs.

Patients care indicators

Patient care indicators address the key issues of what the patient's experience at health facilities was and how they have been prepared to deal with the pharmaceuticals that have been prescribed and dispensed. In this study, the average consultation time was significantly shorter in these facilities (3.4 ± 1.2 SD seconds). The

Table 1
Prescribing indicators for all diseases in public primary health care facilities.

Facility name	Ownership status	Average # drugs	% Generic	% Antibiotics	% Injections	% On EDL
Mkoani	Public	2.6	61.1	50.0	42.9	77.8
Mwendapole	Public	2.4	95.8	30.0	43.3	90.4
Kongowe	Public	2.4	93.2	49.2	32.8	98.6
Soga	Public	2.4	100.0	17.1	19.5	96.0
Mlandizi	Public	2.1	84.5	22.3	33.9	86.8
Mbwawa	Public	1.5	78.6	21.7	13.0	92.9
Kikongo	Public	2.7	81.5	31.1	23.3	99.6
Kwala	Public	1.9	84.7	25.7	18.9	94.4
Magindu	Public	1.8	95.3	31.5	10.2	97.9
Ruvu	Public	3.2	95.2	21.2	21.2	96.4
Average		2.3	87.0	30.0	25.9	93.1
± SD		0.5	11.0	10.8	11.1	6.3
p-value		NS	<0.05			<0.01

NS= Not statistically significant.

Table 2
Patient care indicators for all diseases in public primary health care facilities.

Facility name	Average consultation time (secs)	Average dispensing time (secs)	% Drugs dispensed	% Drugs adequately labeled	% Knows dosage
Mkoani	-	-	-	-	-
Mwendapole	4.1	2.2	74.3	45.5	50.0
Kongowe	4.5	2.5	56.9	12.2	36.7
Soga	4.1	1.6	45.0	15.6	34.1
Mlandizi	4.1	0.1	5.6	71.4	6.7
Mbwawa	3.8	1.2	77.5	10.9	43.5
Kikongo	3.1	2.1	69.8	34.5	54.4
Kwala	3.3	1.6	77.1	6.3	48.6
Magindu	3.5	1.4	78.0	3.2	37.9
Ruvu	3.7	1.9	77.4	1.5	67.3
Average	3.4	1.5	56.2	20.1	37.9
± SD	1.2	0.8	28.6	22.1	19.6
p-value	<0.05				

Table 3
Prescribers clinical assessment of the sick underfive children under age five years in public primary health care facilities.

Facility name	Total number of children	Adequately examined	%	Not examined	%
Mkoani	18	8	44	10	56
Mwendapole	59	31	53	28	47
Kongowe	61	42	69	19	31
Mlandizi	103	69	67	34	33
Soga	41	24	59	17	41
Mbwawa	46	9	20	37	80
Kikongo	90	6	7	84	93
Kwala	74	35	47	39	53
Magindu	108	25	23	83	77
Ruvu	52	8	15	44	85

average dispensing times, drugs dispensed and adequately labeled were also lower (1.5 seconds, 56% and 20%), respectively. The average percent of patients with drug dosage knowledge (38%) was also low (Table 2).

Prescribers assessment

The average consultation time was 3.8 minutes per child. Seventy-five percent of the consultations lasted less than 5 minutes, and none exceeded 10 minutes. Physical examination was not performed in 61% of the children seen with significant inter-facility differences ($p<0.01$) (Table 3).

DISCUSSION

This study shows that malaria was the commonest condition diagnosed at all the health care facilities, despite the fact the malaria transmission period was not at peak when the study was

Table 4
Proportion of chloroquine and antibiotics prescribed for sick underfive children in public primary health care facilities.

Facility name	Number of children	Total chloroquine	Chloroquine inj	Total antibiotics	Antibiotic inj
Mkoani	18	9	3	11	5
Mwendapole	59	45	16	30	11
Kongowe	61	41	7	42	11
Mlandizi	103	66	29	47	7
Soga	41	32	3	23	4
Mbwawa	46	27	1	17	6
Kikongo	90	68	11	60	9
Kwala	74	47	5	36	9
Magindu	108	91	4	53	6
Ruvu	52	37	4	33	85
Total	652	463	83	352	76

carried out in August/September 1998. The peak malaria transmission period in Tanzania in most places is from November to June.

Thus, the presumptive diagnosis of this disease made by health care providers may have been high (morbidity pattern). It is quite possible the average number of cases diagnosed to as malaria was either higher or lower. However, there are a lot of other factors which influence the diagnosis, such as the accuracy in making a correct malaria diagnosis which depends on the individual health care providers skills, experience, seasonality, locality of the area and the presence or lack of laboratory diagnostic facilities in these public primary health care facilities. The majority of these public primary health care facilities lacked diagnostic facilities, such as microscopes. Most of the diagnoses were presumptive.

The average number of drugs prescribed per facility was 2.3 per patient. Of the drugs prescribed, 45% were not dispensed to mothers/guardians as they were out of stock. This means patients had to go without essential drugs or purchase the drugs elsewhere. There are doubts as to whether these mothers could purchase the full dose because of financial difficulties. Shortages of essential drugs in many developing countries has been attributed to inadequate financing from governments and poor managerial skills (Ofori-Adjei and Arhniful, 1996). It has also been reported that use of sub-optimal doses of drugs, especially antimalarials, has serious consequences for increasing resistance (WHO, 1993b).

Again the average number of drugs prescribed per encounter per facility in the present study was low compared to other developing countries like Bangladesh, Nigeria (Ombaka, 1994) and Ghana (Ofori-Adjei and Arhinful, 1996), using the same drug use indicators manual (WHO, 1993b). Possible explanations for this difference in drug prescribing may be due to differences in skills on the part of prescribers, differences in ownership of health facilities (public, private or missionary), lack of diagnostic facilities, differences in social, demographic, cultural and economic factors between the prescribers themselves and the resources their countries have.

In order to measure rational use of drugs for any country, one needs to look at the prescribing practices of the available health care facilities. The commonest drug indicators used today for quick assessment of the prescribing practices is to record the number of drugs prescribed per patient, and take the average percentage of prescriptions with antibiotics or injections, generics and other drugs prescribed to determine if they fell within the country's essential drugs list (EDL) (Kanji *et al*, 1992). Thus, the major problem associated with drug use at many

facilities in developing countries is over-prescribing. Prescribing is considered to be rational if drug use indicators are measured and found to have lower scores (Kanji *et al*, 1992).

The results of generic prescribing and drugs prescribed which were within the EDL show higher scores of performance when compared to a study which was carried out in Dar-es-Salaam (Massele and Nsimba, 1997). These results further shows prescribing according to the National Essential Drug List can strongly be reinforced to prescribers in public primary health care facilities, as the EDL is limited to the public sector alone and leaves the private facilities uncovered. There is a need to advise the Ministry of Health on this so that the private sector becomes covered by the EDL.

The Tanzanian government, through the Essential Drug Program (EDP), has well established drug policies through which the purchasing, prescribing, dispensing of drugs should be generic. It is obvious that the high generic prescribing scores found in these public primary health care facilities may be due to this EDP conditioning in health care providers. This means they are bound to prescribe according to the country's essential drugs list (Ministry of Health, 1883-1984 document). All the EDP drugs are generics. There is a financial advantage associated with the use of generic rather than brand name drugs in most rural settings in Tanzania. Use of brand names costs the patient more money because drugs become unnecessarily expensive (Brater and Pettinger, 1980).

The percentages of prescribing antibiotics and injections in our study were low on average in the 10 public primary health care facilities studied (31% and 26%, respectively), compared to those reported in Dar-es-Salaam, which were 71% and 38%, respectively (Massele and Nsimba, 1997), Nigeria mission facilities prescribed 5.2 drugs per patient on average, 63.1% were injections and 61.9% were generics (Ombaka, 1994). Ghana public facilities had 5 drugs per prescription on average (Ofori-Adjei and Arhniful, 1996). The results of the present study are high compared to accepted International Standards, which recommend prescribing 1.4-2.0 drugs per prescription, and injections should be less than 15% (Laing, 1994).

In Tanzania and most other developing countries there has been wide reports about over-prescribing and over-use of antibiotics and injections in many hospitals/health facilities (public, private and missionary) (Bojali and Calva, 1994; Ombaka, 1994; Massele and Nsimba, 1997). Over use of antibiotics and injections has serious consequences, such as increased resistance (Cohen, 1992; Kunin, 1993) and use of un-sterile injections fosters spread of infections such as abscesses, hepatitis and HIV/AIDS (WHO, 1991).

The dispensing time of drugs in this study was short (1.4 minutes) compared to the recommended 2 minutes (Laing, 1994) and there was no adequate labeling of drugs, which is dangerous, especially to illiterate mothers/guardians as drugs dispensed to them can easily be mixed up at home. It is important to clearly label the name (s) of the drugs and the doses to be taken per day and for how long. It has been reported that rational drug use demands that appropriate drugs be prescribed, be taken at the right dose, at the right intervals and for the right length of time (Ofori-Adjei, 1989). The majority of mothers had a poor knowledge on correct drug use compared to a study done in Nigeria (Ombaka, 1994). There is a danger of giving the incorrect dose to the children.

Under-dosing leads to treatment failures, prolonging the duration of illness and increases chances of developing severe and complicated malaria (Massele *et al*, 1993) and can favor the development of drug resistant malaria strains, especially with the use of sub-optimal or misuse of antimalarial drugs (Kilama *et al*, 1991; Wernsdorfer, 1991; Boland *et al*, 1993; WHO, 1993b; Hellgren *et al*, 1994; Mwenesi *et al*, 1995; Ofori-Adjei and Arhniful, 1996; Ministry of Health, 2000). Poor knowledge of the correct use of drugs in terms of dosage may be dangerous as it may lead to toxic effects and / or poisoning to patients/children and even death (Kiyingi and Lauwo, 1993).

Tanzania phased out chloroquine, which was a first line drug for uncomplicated malaria, at the end of July, 2001. This cheap, safe, popular and efficacious drug was used for over half a

century before sulfadoxine/pyrimethamine (SP) came into use on 1 August, 2001. However, the country will soon be moving from malaria monotherapy to fixed combination therapy with artemether/lumefantrine, which is an expensive combination drug, but proven to be highly efficacious and safe. In order to preserve its drug use life span, more emphasis should be made prior introducing this fixed combination antimalarial drug on rational prescribing, dispensing and use in order to increase the cure rate and delay the risk of developing parasite resistance.

This study has shown high performance for prescribing drugs using generic names and prescribing drugs in accordance to the country's EDL. The main concerns are in the following areas: prescribing of antibiotics, injections, unavailability of essential drugs, too short dispensing and consultation times, inadequate labeling of drugs, no proper instructions given to mothers by dispensers and mothers/guardians poor knowledge on how to administer/give the dispensed drugs to their sick children at home.

This study indicates the need to have continuous and regular educational intervention programs introduced to public primary health care facilities for all prescribers and drug dispensers, to improve rational drug prescribing, dispensing, and instructions given on the proper use of drugs dispensed to clients. Furthermore, all mothers/guardians who visit these facilities should be taught correct drug administration information. Such a program should be given priority, and emphasized on a daily basis by health care providers as a routine in training rational use of all drugs available in the country. All these can be achieved through well organized and planned health education training programs in Tanzania.

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