RATIONAL DRUG USE IN CAMBODIA: STUDY OF THREE PILOT HEALTH CENTERS IN KAMPONG THOM PROVINCE

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Abstract. This study obtained baseline information for the design of a strategy to address irrational prescribing practices in three health centers in Kampong Thom Province, Cambodia. Indicators of rational drug use have been measured and compared with Standard Guidelines. Data were collected from patients' registers and by interviewing patients immediately after patient-prescriber and patient-dispenser encounters. Checklists and pre-designed forms were used to collect data regarding the World Health Organization drug use indicators and some additional indices. Of the 330 prescriptions analyzed, the results showed that the average number of drugs per prescription was 2.35 and that a large proportion of the prescriptions contained two or more drugs that could result in adverse drug interactions. Prescribing by generic names (99.8%) was encouraging. The exposure of patients to antibiotics (66% to 100%) was high, and injection use (2.4%) was often unnecessary. Prescribing from the Essential Drugs List (99.7%) was satisfactory. The average consultation and dispensing times were short and not sufficient for patients to get health information. All the prescribed drugs were supplied, but all were inadequately labeled. Some 55% of patients knew the correct dosage of their drugs. The availability of key essential drugs (86.6%) was below the Standard. The percentages of appropriate prescriptions for treating malaria, diarrhea and acute respiratory infection treatment were 68.3%, 3.3%, and 45%, respectively. Inappropriate prescriptions were mostly due to unsuitable dosages, incorrect drugs, and the improper duration of treatment. The results suggest a need for intervention to curb the irrational use of drugs in prescribing at the three pilot health centers. Continuing education of prescribers and healthcare providers, monitoring, supervision, public education would be beneficial.

INTRODUCTION

It is well accepted that the promotion of rational drug use lead to improvements in the quality and efficiency of healthcare services. However, there are several factors that promote irrational prescribing. Cambodia faces many problems in the wake of a long period of civil war. The health care sector is beset by difficulties: the low availability of health service units, insufficient number of qualified and competent staff, and the low coverage by, and accessibility to, health services. In order to improve the health situation of the country, the Ministry of Health of Cambodia has introduced a Health System Reform Program. The *Operational District*s were designated to locate health facilities on a demographic and geographic basis rather than by administrative district. Each Operational District is composed of one referral hospital and a number of health centers. Each health center serves some 10,000 people; a referral hospital serves 100,000-200,000 people (Ministry of Health, Cambodia, 1997). The Cambodian Ministry of Health has published a list of Essential Drugs and formulated the National Prescribing Guidelines with which health centers and hospitals should comply (Ministry of Health, Cambodia, 1999a). National Standards of Drug Use, developed using a framework provided by the World Health Organization and the International Network for Rational Drug Use (WHO, 1993), have been used for monitoring and supervising drug use practices in health centers and hospitals.

This study aimed to describe the drug use problems, and to identify whether or not the health center prescriptions follow the desired national guidelines; the study goes on to assess the prescribing and dispensing practices of health workers, in term of the degree of conformity with the Essential Drugs List and National Standard Guidelines, in three fully functioning Pilot Health Centers of Baray-Santuk district, Kampong Thom Province.

MATERIALS AND METHODS

This descriptive study was carried out in February 2001, at three fully functioning pilot health centers: Kova, Prasat, and Treal, all located in the Baray-Santuk Operational District. Each health center serves approximately 10,000 people. The rational use of drugs in these health centers was assessed in two ways.

First, a comparison was made with existing standards, using twelve indicators (Table 1) based on the recommendations of the International Network of Rational Use of Drugs (INRUD) and the WHO Action Program in

Table 1
Indictors of rational use of drugs.

1   Prescribing indicators
   1.1 Average number of drugs consultation
   1.2 Drugs prescribed by generic name (%)
   1.3 Consultation resulting in an antibiotic prescription (%)
   1.4 Consultation resulting in an injection prescription (%)
   1.5 Drugs prescribed from Essential Drugs List (%)

2   Patient care indicators
   2.1 Average consulting time
   2.2 Average dispensing time
   2.3 Drugs actually dispensed (%)
   2.4 Drugs adequately labeled (%)
   2.5 Patient's knowledge of correct dosage

3   Health facility indicators
   3.1 Availability of Essential Drugs List/Formulary
   3.2 Availability of key drugs

Essential Drugs, and desired national standards (Table 2) that have been proposed by the Ministry of Health (Ministry of Health Cambodia, 1999a).

In order to evaluate drug use and the appropriateness of prescribing, a sample of 103 prescriptions were drawn from each health center. Based on three categories of indicators suggested by the WHO for determining rational drug use, several forms and checklists were developed.

Turning to assessing patient care indicators, 20 patients were randomly selected at each center in order to determine the dispensing procedure, consultation time, and drug labeling. Then patients were interviewed about their knowledge of the medicines dispensed. The assessment of facility indicators included verifying that the Essential Drugs List and Standard Treatment Guideline were available and checking for the availability of key products.

The second means consisted of assessing prescribing practices, using three common health problems selected in order to assess the appropriateness of prescriptions according to diagnosis: malaria, diarrhea in children of less than five years of age, and acute respiratory infection (ARI) in children of less than five years of age. Criteria for the appropriateness, or rational use, of drugs were established (Table 3), and formats and checklists for assessment were developed. The samples for prescribing practices included: 110 cases that were systematically selected from all records and twenty cases of each of the three specific conditions that were randomly selected from disease-specific records in each health center.

For malaria, we evaluated use of antimalarials by following the National Standard Treatment Guideline. Diagnosis was by dipstick test in two of the health centers (Treal and Prasat) and by clinical diagnosis at the third, Krova.

The prescription of ORS for the treatment of diarrhea in children (< 5 years) was assessed by collecting and analyzing twenty prescriptions from each health center. We assessed the use of ORS by referring to the Standard

Table 2
Desired National Standard Indicators in Cambodia (Year 2000).

Indicators	National standards
Average number of drugs prescribed	< 2
Drug prescribed by generic name	100%
Antibiotics prescribed	< 32%
Injections prescribed	< 1%
Drug prescribed from Essential Drugs List	100%
Drug adequately labeled	100%
Consultation time	> 10 minutes
Dispensing time	> 5 minutes
Confirmation of instruction	100%
Availability of key essential drugs	100%
Availability of essential documents (Essential Drugs List and Standard Therapeutic Guidelines) in consultation rooms	100%

Table 3
Criteria for evaluating appropriate use of anti-malarial drugs, ORS, and antibiotics.

Score	Appropriateness	Criteria
Anti-malarials		
0	Inappropriate	Incorrect choice of anti-malarial
1	Questionable	Correct choice, but: - Dosage incorrect, or - Route incorrect, or - Duration incorrect
2	Appropriate	Correct choice ; AND dosage, AND route of administration AND duration of treatment
ORS		
0	Inappropriate	Incorrect choice of drug
1	Questionable	Correct choice; but: - ORS preparation incorrect, or - Dosage incorrect, or - Duration incorrect
2	Appropriate	Correct choice AND correct ORS preparation AND correct dosage AND correct duration
Antibiotics		
0	Inappropriate	No indication for this antibiotic or wrong choice
1	Questionable	- Indication unclear, or - Choice inappropriate, or - Dosage inappropriate, or - Route inappropriate, or - Duration inappropriate
2	Appropriate	According to the diagnosis and available information: Sound indication, AND correct antibiotic, AND dosage, AND route of administration, AND duration; OR antibiotic not prescribed because not indicated

Treatment Guideline. A similar method of assessment was used for antibiotic prescription in acute respiratory tract infections.

RESULTS

It was found that at the three pilot health centers, only the percentage of generic drug use conformed to the Desired National Standard. All the drugs prescribed were available for dispensing and Essential Drugs List and Standard Therapeutic Guidelines were found at all health centers. However, problems found included high antibiotic use (66-100%), polypharmacy (2.35 per consultation), and the unnecessary use of injections (0.9-4.5%).

The time that patients spent with prescribers and dispensers was limited: consultation time and dispensing time were each about 4 minutes. We found that the patients' knowledge of correct dosages was fair (45-65%); confirmation of instructions for drug administration was variable (range 30-70%). Alarmingly, no single medicine was adequately labeled (0% properly labeled). The availability of drugs in stock was not satisfactory (86.6%) and pictograms on plastic bags were used only at Treal (Table 4).

As Table 5 shows, the appropriate prescription of antimalarials was only 68.3%; correct drug choice was 100%; correct dosage was 76.7%; correct route of administration was 98.3%; and correct duration of treatment was 80%.

Appropriate prescription of ORS for treating watery diarrhea in children (< 5 years) was very low (3.3%). It was noted that the correct ORS was chosen in 98.3% of cases, correct ORS preparation was 88.3%, correct duration was 68.3%; however, proper dosage was only 10%. All of the prescriptions for diarrhea in children (< 5 years) made in both Krova and Prasat were

Table 4
Summary of prescribing practices.

Indicator studied	Krova	Prasat	Treal	Total	National standard
Number of prescriptions analyzed	110	110	110	330	
Prescribing indicators					
Average number of drugs per prescription	2.26	2.93	1.87	2.35	<2
% generics	99.5	100	100	99.8	100
% antibiotics	60	80.9	57.3	66	<32
% injections	4.5	1.8	0.9	2.4	<1
% on Essential Drugs List	99	100	100	99.7	100
% of children <5 with diarrhea given ORS	90	48	86	74.7	>95
% of children <5 with diarrhea given antibiotics	86	98	60	81.3	<25
% of children <5 with ARI given antibiotics	100	100	100	100	<32
Patient care indicators					
Consultation time (minutes)	4.53	4.61	4.14	4.43	>100
Dispensing time (minutes)	4.36	3.21	4.20	3.92	>50
% drugs dispensed	100	100	100	100	100
% drugs adequately labeled	0	0	0	0	100
% patients knowledge of correct dosage	45	55	65	55	100
% confirmation of drug instruction	70	55	30	51.7	100
Facility indicators					
Available Essential Drugs list	Yes	Yes	Yes	Yes	Yes
Available standard therapeutic guideline	Yes	Yes	Yes	Yes	Yes
% Drugs available in stock	93.3	93.3	73.3	86.6	100
Use pictogram (Plastic bag)	No	No	Yes	-	Yes

Table 5
Appropriate prescription of antimalarials, ORS, and antibiotics.

	Krova		Prasat		Treal		Total	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)
Correct antimalarial use								
Total No. patients	20	(100)	20	(100)	20	(100)	60	(100)
Drug choice	20	(100)	20	(100)	20	(100)	60	(100)
Dosage	10	(50)	19	(95)	17	(85)	46	(76.7)
Route of administration	20	(100)	19	(95)	20	(100)	59	(98.3)
Duration	10	(50)	19	(95)	19	(85)	48	(80)
Appropriate prescription	7	(35)	17	(85)	17	(85)	41	(68.3)
Correct ORS use in diarrhea (children < 5 years)								
Total No. patients	20	(100)	20	(100)	20	(100)	60	(100)
ORS choice	19	(95)	20	(100)	20	(100)	59	(98.3)
ORS preparation	16	(80)	17	(85)	20	(100)	53	(88.3)
Dosage	0	(0)	0	(0)	6	(30)	6	(10)
Duration	19	(95)	20	(100)	2	(10)	41	(68.3)
Appropriate prescription	0	(0)	0	(0)	2	(10)	2	(3.3)
Correct antibiotics use in ARI (children < 5 years)								
Total sample patients	20	(100)	20	(100)	20	(100)	60	(100)
Drug choice	17	(85)	11	(55)	17	(85)	45	(75)
Dosage	16	(80)	18	(90)	18	(90)	52	(86.7)
Route of administration	20	(100)	20	(100)	20	(100)	60	(100)
Duration	16	(80)	16	(80)	19	(95)	51	(85)
Appropriate prescription	8	(40)	5	(25)	14	(70)	27	(45)

inappropriate. Treal issued only two appropriate prescriptions. In the vast majority of cases, ORS was prescribed in inappropriate dosages. Only 10% of the patients of Treal were given ORS for an adequate period of time.

The appropriate prescription of antibiotics for children's (<5 years) ARIs was 45%; the correct drug was chosen 75%; correct dosage was 86.7%; correct route of administration was 100%; and correct duration of treatment was 85%. Appropriate prescriptions in Prasat were too few (25%); Krova's rate was only 40%. Treal however was encouraging: 70%. The main problem in Prasat was improper drug choice (55%).

Overall, only anti-malarial use was considered satisfactory. The use of ORS in diarrhea was poor (3.3%); antibiotic use in ARI was also high (45%). Prescriptions were inappropriate mostly because of errors of dosage and duration.

DISCUSSION

Rational prescribing is still a serious problem in the three health centers. We found that polypharmacy, although not a great problems, still posed the risk of adverse drug interactions. Data from other countries showed that polypharmacy could range from 1.3 to 2 drugs per patient. However, Indonesia, Nigeria, and Ghana differ significantly from this with average with rates that exceed 3 per encounter (WHO, 1993; Santoso, 1997; INRUD, 2000). In such cases we should also take into consideration drug combinations. The use of

generic prescribing (99.8%) seems to comply with the Desired Standard.

We found inappropriate prescribing of antibiotics (66%) in all categories of prescriptions: 100% for children (<5 years) with ARI, and 81.3% for children (< 5 years) with watery diarrhea. Antibiotics were used indiscriminately in minor ARI and watery diarrhea, which is generally caused by a viral infection. Studies in various countries found that the prescription of antibiotics tends to lie in the range of 25-40%, though some nations (Indonesia, Nepal, Ghana, Nigeria, Cameroon, and Sudan) have considerably higher averages (40-60%) (WHO, 1993; Santoso, 1997; INRUD, 1998). Antibiotic resistance is a worldwide problem associated with the use, overuse, and misuse of antibiotics.

Inappropriate use of injections in this study (2.4%) should be seen from both health and economic points of view. The use of injections is affected by the availability of injectable drugs and syringes and needles. However, in some countries rates are as high as 48%, in Uganda for instance (Sarah *et al,* 1997). In comparison with Uganda, the use of injections was far lower. In Cambodia, the commonest diseases, in their uncomplicated forms, do not generally require injectable drugs; any patient who needs an injection should be sent to a referral hospital.

The percentage of drugs prescribed from the Essential Drugs List seems to be close to the Desired Standard. The selection of essential drugs leads to better supply, more rational use, and lower cost.

Turning to patient care indicators, we noticed that the short consultation and dispensing times (4.43 minutes and 3.92 minutes respectively) led to inadequate information about medication being given to the patients. Patients had little chance to obtain information about their treatment. In addition, all drugs dispensed were improperly labeled (0% proper labeling). Dispensing is an essential element of rational drug use, since it is the last point of contact that patients have with their healthcare providers. All efforts and resources involved in patient care up to this point may be wasted if dispensing does not ensure that patients receive the appropriate form of prescribed drug(s), in correct quantities and doses, and appropriate packaging and accompanying advice. Dispensing errors are not rare, however, the importance of dispensing is often overlooked. Poor patients' knowledge of correct dosage (56.7%) led to poor therapeutic outcome.

Regarding patient care, this survey found that at all three health centers dispensers were not confirming their drug instructions. The dispenser asked the patients in only 51.7% of cases to repeat what had been said in order to remind them the use of their medicines. It was noted that the percentage of patients with correct knowledge of dosage was increased at the health center that used pictograms on the packaging of the drugs. In Treal Health Center, where the pictogram bags were used, the percentage of confirmation of drug instructions was low (30%), but the percentage of patients' knowledge was high (65%). In contrast, at Krova Health Center, although the percentage of confirmation on drug instruction was high (70%), the percentage of patients' knowledge was not satisfactory (45%). The use of pictograms for packaging drugs is useful for all but especially for illiterate patients.

Drug use can be influenced by the availability of drugs, either the under-supply of essential drugs or the over-supply of non-essential pharmaceutical products. In this study, we found that the availability of drugs in stock was 86.6%.

Healthcare providers should be encouraged to comply with the Standard Therapeutic Guidelines in their day-to-day practice. Treatment guidelines have the strongest long-term impact if they are frequently updated, widely distributed, integrated in the training of prescribers, and used for drug use review. Managerial strategies require a major effort, but are likely to be the most successful and sustainable way of addressing irrational use of drugs. Implementation of the Standard Treatment Guidelines is one example of a managerial strategy. Standard Therapeutic Guidelines should

be introduced with an official launch in combination with intensive training programs. Supervision and refresher training should reinforce their use. Standard Therapeutic Guidelines will gain greater acceptance if emphasis is placed on improving the quality of care rather than reducing costs.

Reducing the irrational use of drugs at the health center level remains a major challenge. In the Cambodian healthcare system, considerable constraints exist, such as the irrational use of drugs in newly functioning health centers, the lack of communication between storekeeper and prescriber, a lack of awareness of the Standard Therapeutic Guidelines, pressure from patients, a lack of competence among prescribers, a lack of experience among the new District Health Office supervisors, and the short expiry date of drugs and medical equipment from Central Medical Store of Ministry of Health. Different cultures view drugs in different ways, and this can affect the way drugs are used. Different systems and healthcare infrastructures can also influence how drugs are used.

In this study, it seems that staff at the Treal Health Center followed the standard guidelines more faithfully than at the other two health centers. For improving and strengthening the rational use of drugs in Cambodia, the Ministry of Health (Ministry of Health, 1999b), through the Department of Drugs and the Department of Health and in collaboration with International Organizations (WHO, UNICEF, MSF, AEDES, KFW), has defined the main strategy as follows:

- Monitoring and supervision of drug management and rational use of drugs
- Organizing training and workshops
- Education campaign

Training in the rational use of drugs, including the use of Standard Treatments, is not a regular feature in health services in Cambodia, but it is conducted in certain areas. Generally, the implementation of Standard Therapeutic Guidelines is combined with training, but is not followed up by regular monitoring and supervision. These constraints may be due to the under-financing of supervision and training.

In Cambodia most drugs, including prescription drugs, can be freely purchased over the counter, so the need for public education is great. This is also the case in communities targeted by aggressive pharmaceutical promotion. Healthcare providers are in the forefront of rational drug use activities; they play a pivotal role, and have a professional obligation to improve prescribing practices and the quality of patient care.

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REFERENCES

The International Network for Rational Drug Use. Promoting rational drug use. 1998. Available at http://dcc2bumc.bu,edu/prdu/HTML_ DOCS_TOC.htm, accessed 20 Dec 2000.

Ministry of Health, Kingdom of Cambodia. National level indicators for monitoring and evaluating health sector performance. Department of Planning and Health Information. 1999a.

Ministry of Health, Kingdom of Cambodia. Clinical and therapeutic guidelines (Referral Hospital), 2nd ed. Department of Planning and Health Information. 1999b.

Ministry of Health, Kingdom of Cambodia. Guidelines for developing operational districts. Department of Planning and Health Information. 1997.

Santoso B. Problems with drug use and the impact on health care in Southeast Asia. *JAMA SEA* 1997; 13: 5-6.

Sarah D, Kasewa GW, Pariyo O, *et al*. Evaluation of drug use practices in government health units. *J Clin Epidemol* 1992; 50: 44S.

World Health Organization. How to investigate drug use in health facilities: Selected drug use indicators. *WHO/DAP/93.1*. 1993.