



Major Article

Antibiotic prescribing practices: A national survey of Cambodian physicians



Chhorvoin Om MD, MIPH ^a, Erika Vlieghe MD, PhD ^b, James C. McLaughlin PhD ^c,
Frances Daily BMBS DTMH ^c, Mary-Louise McLaws PhDMed ^{d,*}

^a School of Public Health and Community Medicine, UNSW Medicine, UNSW Australia, Sydney, New South Wales, Australia

^b Department of Clinical Sciences Antwerp, Institute of Tropical Medicine, Antwerp, Belgium

^c Diagnostic Microbiology Development Program, Phnom Penh, Cambodia

^d School of Public Health and Community Medicine, UNSW Medicine, UNSW Australia, Sydney, New South Wales, Australia

Key Words:

Resistance
Attitude
Knowledge
Infectious disease
Public hospital

Background: Antibiotic resistance is a threat to global health security. We assessed knowledge, attitudes, and practices in regard to antibiotic prescribing and resistance in Cambodian physicians from public hospitals.
Methods: A cross-sectional knowledge, attitudes, and practices survey was distributed to physicians from 19 public hospitals.

Results: The response rate was 78% (689 out of 881). The majority (88%; 607 out of 686) of physicians understood that antibiotic resistance was a local challenge. More than half (54%; 366 out of 682) believed that antibiotic prescribing was inappropriate in their hospital and 93% (638 out of 684) had difficulties in selecting appropriate antibiotics to treat common infections. The majority (86%; 574 out of 667) and one-third of physicians (36%; 236 out of 665) would prescribe antibiotics for uncomplicated common cold and diarrhea in children < 5 years of age, respectively. Half (58%; 385 out of 668) had experience treating methicillin-resistant *Staphylococcus aureus* infection, but the majority (73%; 188 out of 258) could not identify antibiotics to treat this infection. Only 17% (115 out of 667) had experience treating endemic melioidosis. All physicians agreed that knowledge about local antibiotic resistance, treatment guidelines, and educational programs were necessary.

Conclusions: Cambodian physicians are aware of antibiotic resistance challenges but they do not possess the required knowledge of local antibiotic resistance patterns that would assist their prescribing practices. Cambodian physicians need support to improve antibiotic prescribing.

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BACKGROUND

Antibiotic resistance that is exacerbated by inappropriate use and prescribing practices poses a significant threat to global public health security.^{1,2} Inappropriate antibiotic use is driven by multiple factors, including socioeconomic and behavioral determinants and lack of law enforcement that allows nonprescription antibiotic use worldwide.³⁻⁵ In clinic settings, inappropriate antibiotic

prescribing is facilitated by diagnostic uncertainty,^{3,6} insufficient diagnostic microbiology services,^{3,7} fear of poor treatment outcomes,^{3,7} and poor hygiene and infection control practices in health care facilities.^{4,8}

Recent microbiology studies from different sites in Cambodia have reported high prevalence of multiresistance to antibiotics commonly available within the country. For example, 80%-97% of *Salmonella* Typhi strains isolated from bloodstream infections demonstrated decreased susceptibility to ciprofloxacin⁹⁻¹¹ and 20%-50% of *Staphylococcus aureus* bloodstream infections were methicillin-resistant *Staphylococcus aureus* (MRSA).^{9,12} The challenge of inappropriate antibiotic prescribing is intensified by unrestricted access to antibiotics.¹³ To help improve antibiotic prescribing, it is imperative to understand knowledge, attitudes, and practices (KAP) of physicians. We conducted a KAP survey of Cambodian physicians working in public hospitals to provide evidence that could assist policy formulations and interventions to address inappropriate antibiotic prescribing and resistance.

* Address correspondence to Mary-Louise McLaws, Med, School of Public Health and Community Medicine, UNSW Medicine, UNSW Australia, Level 3 Samuels Bldg, Sydney, NSW 2052, Australia.

E-mail address: m.mclaws@unsw.edu.au (M.-L. McLaws).

Fondation Mérieux, Cambodia, France, and Institute of Tropical Medicine, Antwerp, Belgium, provided financial support for the fieldwork and AUSAID awarded a PhD scholarship to CO to train at the UNSW Australia. Dr Jan Jacobs, Institute of Tropical Medicine, provided funding support for the fieldwork.

Conflicts of Interest: None to report.

METHODS AND MATERIALS

Study design and setting

Our study was a cross-sectional KAP survey conducted between August 19 and September 25, 2013, by using a self-administered questionnaire. Cambodia is a low-income country located in South-east Asia with a population of 15.33 million.¹⁴ About 80% of Cambodians live in rural areas.¹⁴ The Cambodian health care system is divided into 3 levels (national, provincial, and district) and consists of 1,236 health care facilities, including 8 national hospitals, 24 provincial hospitals, and 59 district hospitals.¹⁵

Sampling

Sampling was purposefully weighted for national hospitals located in the capital city and nonnational hospitals located in provinces and districts in areas of high population density. Our research budget dictated the sampling rationale that attempted to reach physicians in populated areas so that as many as possible of the physicians who prescribe antibiotics would be surveyed. Six of the 8 national hospitals were selected for the survey, whereas 2 were excluded because neither had prescribing practice comparable with public hospitals (1 was a tuberculosis hospital and the other was a charity pediatric hospital). A random selection of 5 out of 17 provincial hospitals and 8 out of 48 district hospitals were in highly populated areas to improve the generalizability of prescribing practices. In total, 19 hospitals were selected, of which 5 had a microbiology laboratory (4 were national hospitals and 1 was a provincial hospital). All physicians in the selected hospitals were invited to participate in the survey.

Questionnaire

A self-administered questionnaire previously used for a KAP survey in a developing country¹⁶ was modified with the inclusion of Likert-type scale items and common clinical case presentations specific to Cambodia. A panel of national and international experts reviewed the questionnaire for content and face validity. The questionnaire was field tested with 23 physicians who were located in a nonparticipating provincial hospital. The questionnaire was distributed directly to each physician in the 19 hospitals together with an envelope in which to seal the questionnaire before collection 2 days later. Four items collected demographic data; 23 items measured attitudes on a 7-point Likert-type scale (with a high Cronbach's α correlation: $r = 0.862$) plus a Yes/No question; 11 items, including 6 clinical case presentations assessed knowledge; and 7 items assessed practices. The distributions of the responses to the Likert-type items were all skewed and therefore all were recoded into dichotomous responses of agree/disagree, frequent/infrequent, useful/nonuseful, and important/unimportant.

Data analysis

Two research assistants entered data into an Excel spreadsheet (Microsoft, Redmond, WA) and 1 author (CO) checked the data entry for accuracy before importing the data into SPSS version 21 (IBM-SPSS Inc, Armonk, NY) for analysis. To minimize the influence of responses from national hospitals, analyses were stratified by national and nonnational physicians. Nonnational physicians included those working in provincial and district hospitals. Association between national and nonnational physicians and hospitals with and without microbiology laboratory was examined using χ^2 test. Alpha was set at the 5% level. Denominators vary in the analysis because not all physicians answered every question in this survey.

Ethical consideration

This study was approved by the National Ethics Committee for Health Research of the Cambodian Ministry of Health; the University of New South Wales Australia; and the Institute of Tropical Medicine, Antwerp, Belgium. Participating physicians were not asked to sign informed consent form to preserve their anonymity.

RESULTS

Demographic and professional profile

There were 881 physicians in total from the 19 public hospitals and 689 physicians completed and returned the questionnaire, giving a response rate of 78% (689 out of 881). The majority of physicians (74%; 505 out of 684) had more than 10 years of clinical experience. National hospitals had significantly more physicians with > 10 years of clinical experience compared with nonnational hospitals (78% [374 out of 479] vs 64% [131 out of 205]; $P < .001$). Table 1 gives further demographic data and professional profiles of the participating physicians.

Attitudes toward antibiotic resistance and prescribing

Most physicians perceived that antibiotic resistance is a problem globally (95%; 652 out of 684), in Cambodia (98%; 673 out of 685), in their hospitals (88%; 607 out of 686), and in their private practices (82%; 561 out of 685). The majority of physicians (93%, 638 out of 684) reported that they had difficulties in selecting appropriate antibiotics to treat infections. More than half (54%; 366 out of 682) perceived that antibiotics were inappropriately prescribed in their hospital and this perception was significantly more common in nonnational physicians compared with national physicians (64% [130 out of 204] vs 49% [236 out of 478]; $P = .001$). The majority (81%; 548 out of 679) believed that the community used antibiotics inappropriately and 95% (646 out of 683) perceived that patients self-prescribed antibiotics before presenting to hospitals. Only 38% (258 out of 685) of physicians were confident that most antibiotics they prescribed were effective, 56% (386 out of 685) were somewhat confident, whereas 6% (41 out of 685) were not confident at all. The level of confidence was similar between national and nonnational physicians (38% [180 out of 479] vs 38% [78 out

Table 1

Demographic and professional characteristics of physicians participating in the knowledge, attitudes, and practices survey—Cambodia, 2013

Items	% (n/N)
Participating physicians	
National hospitals	70 (482/689)
Provincial hospitals	20 (141/689)
District hospitals (CPA level 1 and 2)	10 (66/689)
Department	
Medical ward	41 (284/689)
Surgical ward	31 (216/689)
Gynecology and obstetrics ward	16 (112/689)
Pediatric ward	10 (68/689)
Others	1 (9/689)
Profession	
Head of department	18 (123/689)
Specialist physicians	31 (215/689)
Nonspecialist physicians	46 (317/689)
Others and unspecified	5 (34/689)
Access to microbiology laboratory	
Physicians from national hospitals	85 (409/482)
Physicians from provincial hospitals	33 (47/141)
Physicians from district hospitals	0

CPA, Complementary Package of Activities.

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