TRAINING PROGRAM FOR YEREVAN FAMILY PHYSICIANS ON ANTIBIOTIC PRESCRIPTION

Master of Public Health Utilizing Community Service Grant Proposal

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TABLE OF CONTENT

Abbreviation List

APUA	Alliance for Prudent Use of Antibiotics
WHO	World Health Organization
CDC	Centers for Disease Control and Prevention
FDA	Food and Drug Administration
WB HPIU	World Bank Health Project Implementation Unit
NIH	National Institute of Health
YSMU	Yerevan State Medical University
ADMTA	Armenian Drug and Medical Technologies Agency
EDL	Essential Drugs List

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EXECUTIVE SUMMARY

The development of antibiotic resistance, known since the early days of antibiotic therapy, has increased in recent years. Antimicrobial resistance can result in increased morbidity, mortality and health-care costs. It has also recently been described as a threat to global stability and national security. Because bacteria do not recognize international boundaries no single nation is protected from the problem of antimicrobial resistance, and Armenia is not an exception.

One of the key determinants of developing antimicrobial resistance is overprescription of antibiotics by physicians. This grant application proposes to develop, conduct and evaluate analogous training program on antibiotic prescribing practices among family physicians in Armenia. The major targeted outcome is the improvement in physicians' antibiotic prescribing practices of antibiotics.

The goal of this program is to reduce the rate of overprescription of antibiotics through an educational program for family physicians in Armenia.

Objectives: 1) at the end of 5-day training period the mean difference of pre-post knowledge scores in the intervention group will be 20% higher than in the control group, 2) 3 months after the program implementation the mean difference of pre-post knowledge scores in the intervention group will be 15% higher than in the control group.

Study population: family physicians practicing in Yerevan. According to the World Bank Health Project Implementation Unit (WB HPIU) there will be approximately 160 family

physicians by 2004. All of them will be included in the study, and randomly divided into intervention and control groups.

Duration of this program will be 6 months (September 2004 to February 2005). The program will include the following phases: pre-intervention, training, first post-intervention data collection, second post-intervention data collection, analysis and preparation of a final report.

Total budget will be $12,915. It includes personnel, training and operational expenses.

SPECIFIC AIMS/OBJECTIVES

This paper proposes to develop, conduct and evaluate training program on antibiotic prescribing patterns among family physicians in Armenia. The research question is: Does the implementation of the educational program increase knowledge of family physicians on antibiotics' prescribing patterns?

The goals of this program are to:

- Increase the knowledge of family physicians on antimicrobial drugs and antimicrobial resistance,
- Familiarize physicians with proper antibiotic prescription and standard treatment guidelines,
- Reduce the inappropriate use of antibiotics by determining factors that influence physicians prescribing patterns.

The measurable objective of the proposed program is to detect a mean difference of pre-post knowledge scores in the intervention group 20% higher than in the control group at the end of 5-day training period and at least 15% higher after 3 months.

If the proposed program appears to be effective and useful, it can be implemented regularly for the rest of family physicians as well as therapists.

INTRODUCTION

Background information

Development and use of antimicrobial agents was one of the most important measures leading to the control of bacterial diseases in the 20th century [1]. Due to their effectiveness, the morbidity and mortality from infectious diseases dramatically decreased during the last 60 years [2]. Despite this half-century of success, periodic warnings have recurred as resistance almost always followed the introduction of a new drug. The development of antibiotic resistance, known since the early days of antibiotic therapy, has increased in recent years [1]. Antimicrobial resistance can result in increased morbidity, mortality and health-care costs [2]. It has recently been described as a threat to global stability and national security [2]. There is no doubt that antimicrobial resistance poses a global threat [2].

No nation is protected from the problem of antimicrobial resistance, and Armenia is not an exception. Bacteria do not recognize international boundaries, and the intercontinental spread of resistant bacteria is well known [3]. Although the spread of antimicrobial resistance has been fully documented in western literature no data exist on the prevalence of antimicrobial resistance in Armenia. But many threatening factors for development of antimicrobial resistance are present in the country.

Misuse or inappropriate use of antibiotics is the key factor in the development of antimicrobial resistance [4]. Physicians, patients, pharmacists and other health care providers are responsible for their negligence of the appropriate use of antimicrobials. Inappropriate antibiotic use is characterized by any of the following:

- Overprescription: prescribing an antibiotic not needed clinically,

- Self-treatment: a patient takes medication without a doctor's prescription. This factor is intensified by unlimited access to antibiotics in drug stores. In Armenia antibiotics are sold without a prescription.
- Poor adherence to dosage regimens that include incorrect selection of dosage or duration of treatment, and cessation of treatment as soon as feeling better.

The first two factors are also enhanced by aggressive advertisement and promotion of antimicrobial drugs and, as a result, many patients and prescribers believe that new antimicrobials are more effective than older drugs. All these factors are interconnected and influenced by the interplay of the knowledge, expectations of patients and health providers, economic incentives and governmental regulations [5].

Literature review

Antimicrobial resistance is not a new concept. Resistance to antimicrobials is a natural biological phenomenon. Resistance is the ability of strains of microorganisms to multiply in the presence of drug concentrations higher than in humans receiving therapeutic doses [4]. For over half a century, health care providers have been faced with this problem [6]. Thirty years ago the British Medical Journal (BMJ) published a paper on antibiotic resistance, its mechanisms of transmission, and implications, which embraced essential answers [7]. Large body of research revealed the main reasons of antimicrobial resistance: overuse and misuse of antibiotic therapy, development and transmission of multiresistant pathogens or genetic materials between humans [1].

Many studies have reported increasing prevalence of antimicrobial resistance. For example, in 1998 the BMJ published a report that asked several questions and one of which was "Is there a problem of antimicrobial resistance? " The answer is yes and no [7]. Some bacteria still remain sensitive to long established treatments, including *Chlamydia trachomatis* to tetracycline and macrolides, *Streptococcus pyogenes* to penicillin, and most anaerobes to metronidazole. However, there is an increasing array of resistance problems, including penicillin resistant *Pneumococci*, multidrug resistant *Salmonella typhi,* multidrug resistant *Mycobacterium* and others [6]. The problem is undoubtedly increasing: for example, penicillin resistant M*eningococci* are emerging, and antiviral resistant HIV emerges even during the treatment [6].

It is estimated that half of the 100 million annual antibiotic prescriptions in the United States are unnecessary [8]. In Norway, the prescription rate of antibiotics has risen by 40% from 1980 to 1993 [9]. Dr. Levy, the president of the Alliance for the Prudent Use of Antibiotics (APUA), recalls a seminar he conducted during which 80% of the physicians admitted to having provided antibiotic prescription on demand against their better judgments, which could be the result of societal mentality for quick solutions "Give me something to get me better, now!"[10]. Physicians often over-prescribe antibiotics because of patient expectations, insufficient time to discuss with patient why an antibiotic is not needed, and concern that they may misdiagnose bacterial infections when an antibiotic is indicated [8]. Much of the increase in antibiotic resistance is a result of the use of antibiotics for viral infections, such as the common cold against which antibiotics are ineffective [9]. Together, these factors contribute to the overuse of antibiotics.

The APUA conducted a survey in Massachusetts, in August 1998; the main objective of the survey was to determine factors influencing physicians' prescribing patterns [11]. The Members of Massachusetts Society of Infectious Diseases (7, 976 community physicians) were asked to complete a one-page self –administered questionnaire. The survey found that 93% of physicians were of the opinion that antibiotics are over-prescribed. The findings suggest that improved diagnostic methods and targeted educational campaigns aimed at improving diagnostic skills and increasing awareness of the problem of antibiotic resistance will foster more appropriate antibiotic use [11].

The World Health Organization (WHO) has developed a Global Strategy for Containment of Antimicrobial Resistance. It provides a framework for interventions to slow the emergence and reduce the spread of antimicrobial resistant microorganisms through improving the prudent use of antimicrobials (3). Surveys conducted by the WHO in Asia and Latin America showed that of the antibiotics prescribed in 35% to 60% of clinical encounters only 20% were appropriate (3). An educational intervention was implemented with physicians being the predominant focus of studies. The major targeted outcome was an improvement in physicians' prescribing practices of antibiotics. Educational intervention resulted in 17% and seminars in 10% decrease in the number of antibiotics prescribed [3].

In 1999, the Task Force on Antimicrobial Resistance Interagency (TFARI) was created. This agency includes Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), National Institutes of Health (NIH) and other analogous national organizations in the United States. The Public Health Action Plan to Combat Antimicrobial Resistance (Action Plan) was developed by the TFARI. The major focus of this plan is the prevention and control of drug-resistant infections. Appropriate drug-use policies will be

implemented through a public health education campaign on appropriate antimicrobial drug use as a national health priority. Other actions in support of appropriate drug use will include reducing inappropriate prescribing through development of clinical guidelines, supporting other interventions promoting education and behavior change among clinicians, and informing consumers about the uses and limitations of antimicrobial drugs [12].

There are no clear data regarding the rate of antibiotic prescribing in Armenia [13]. Because resistance does not recognize national boundaries and has reached critical proportions Armenia should be aware of this problem. Furthermore, almost all factors leading to development of resistant pathogens are present in the community [14]. For example, Armenian urologists have encountered difficulties in the treatment of chronic pyelonephritis [14]. In 90% of cases the pathogen is *Escherichia coli*, which is very sensitive to gentamycin [15]. But during the last 20 years gentamycin was used in combination with trimethoprim-sulphamethoxazol against almost all urinary tract infections, although there was no rationale for such a treatment [14,16]. As a result a resistant form of *Escherichia coli* has developed [14].

Despite all these threatening facts, not educational program on antibiotics and their proper prescription was implemented among health providers in Armenia [13]. Moreover, students at Yerevan State Medical University (YSMU) and NIH have not separate classes on antibiotics in their curriculum [17]. This points the necessity of conducting an educational program among currently practicing physicians, and including special classes on antibiotics in the curriculum of medical students. Literature indicates that fully implemented community strategies can reduce the development of resistance [14,18].

Appraisal of Different Strategies

The most effective way to prevent the development of antibiotic resistance is to influence all the determinants of the problem. Pharmacists, physicians and patients, should be educated on prudent use of antibiotics. Unfortunately, such a strategy is difficult to achieve, because it requires too much resources.

The Armenian Drug and Medical Technology Agency (ADMTA) established the Essential Drug List (EDL) and List of Drugs with prescription-only legal status [13]. Antibiotics are also included in this list (see Appendix 1). But because of the lack of enforcement, there is minimal control over public access to antimicrobial drugs as they still can be purchased over the counter without prescription [13].

One way to combat resistance is to educate pharmacists as they have special knowledge of drugs and their effects. Also many patients do not visit physician and purchase antibiotics by pharmacists' advise.

However, there are some potential obstacles in implementing an effective program involving pharmacists. First, the sale of antibiotics is one of the most profitable aspects of the pharmaceutical business. Heads of pharmacies would not agree to sell antibiotic only by prescription. Second, in most drug stores, pharmacists are more likely to recommend antimicrobial use, particularly the more expensive agents, regardless of whether there is any need of antibiotic therapy or if a cheaper drug can be used. The reason is that in many drug stores the salaries of pharmacists depend on the profit margin.

The ADMTA have conducted several conferences with physicians during which guidelines of the standard antimicrobial treatments were discussed [13]. But no structured training or educational programs were implemented by this agency.

Recommendation for a Course of Action

It is obvious that implementation of any of the mentioned strategies is time-consuming and requires financial and human resources.

This paper proposes to develop, conduct and evaluate a training program on antibiotic prescribing patterns among family physicians in Armenia. The overall goal of this program is to reduce the overprescription of antibiotics.

The goals of this study are to:

- increase knowledge of family physicians on antimicrobial drugs and antimicrobial resistance,
- familiarize physicians with antibiotic prescription and standard treatment guidelines,
- reduce the inappropriate use of antibiotics by determining factors that influence physicians prescribing patterns.

The main challenge of rational antibiotic use by prescribers is that drug knowledge alone is not enough to change prescription patterns. Training will help to put principles of rational drug use into practice. Family physicians are chosen as a target group, because:

- Family medicine is a new medical branch in Armenia (exists for about 5 years), and most of the specialists are young and ready to accept new information.

- About 160 family physicians will be practicing in Yerevan by 2004 (when the program is proposed for implementation), and it is possible to train all of them stepwise, group by group.
- Family physicians have to deal with many infections. In contrast to specialists, family physicians have a broad background on most diseases.
- Family physicians are the first link between the patient and a specialist. Family physicians make diagnosis and treat patients with non-complicated diseases.
- Home visits are among the responsibilities of family physicians. They have to deal with many patients not only in hospital, but also in community settings.

Thus, this study proposes to increase the knowledge of family physicians on antibiotics and their proper prescription, which could help to reduce development of antimicrobial resistance in Armenia.

If the program is found to be effective, it will also be implemented among the rest of family physicians and therapists.

METHODOLOGY

Community of interest

Family Medicine is an oldest profession but the youngest discipline, which has recently been initiated in many countries, particularly in the republics of the former Soviet Union [19]. The principles of Family Medicine are the following; 1) family medicine is community-based, 2) doctor-patient relationship is central to family medicine, and 3) family physicians are

effective clinicians, meaning they have the special skills to provide care for the entire life cycle [20].

Family physicians have extensive knowledge of anatomy, histology, pathology, clinical signs and symptoms, and treatment strategies. Family physicians could treat 91% of all health problems [21]. Family physicians play the role of a coordinator at the health care centers. They are the first link between the patient and narrow specialists. Furthermore, family physicians perform home visits and thus consult patients not only on hospitals but also in the community. According to data from World Bank Health Project Implementation Unit (WB HPIU), by 2004 about 160 family physicians will work in Yerevan. Hundred and thirty of them are currently working; the other 30 are still students of the Departments of Family Medicine at YSMU and the NIH.

Implementation plan

Phase 1: Pre-intervention (duration 30 days)

Administrative processes: This phase includes staff recruitment and training, renting an office and other necessary equipment (computers, projector, etc.), curriculum development, and duplication of questionnaires, handouts and brochures. An expert with an appropriate background (e.g.from ADMTA or NIH) will train assistants on general concepts of antibiotics and antimicrobial resistance, as well as introduce them the main goals and objectives of the program. Assistants with medical or pharmaceutical backgrounds will be hired.

Selection of program participants will be based on a list of family physicians obtained from YSMU and the NIH. Then the participants will be randomly assigned to intervention and control groups (80 in each).

Phase 2: Intervention-training (duration 5 days):

Resources needed during the training are laptop, projector and handouts/brochures. The following topics will be covered during the 5-day training:

- Antimicrobial drugs, mechanism of action and use of antibiotics in medicine
- Antimicrobial resistance, development and threats of resistance; situation in Armenia
- Introduction to strategies and guidelines on antibiotic prescription

A lecturer from YSMU will conduct lectures on antibiotics, their effectiveness and side effects. An ADMTA expert will introduce the problem of development of antimicrobial resistance in western countries and in Armenia. He will familiarize participants with standard treatment and prescription guidelines. Lecturers and the program coordinator will conduct group discussions. Participants will get case histories and try to choose treatment mechanisms according to standard guidelines.

During the first day of the training module the program coordinator will provide assistance with permission letters for participating in the program. This will help participants not to have problems while being absent from their work place. Classes will take about 4 hours per day for 5 days. (The Curriculum of the training program is displayed in Attachment 2).

Evaluation plan

The objective of the evaluation component is to assess the effectiveness of the educational program. The program will be considered effective if 20% or more increase in the post-test knowledge score is detected compared to the pre-test, and at least 15% increase in the

post-test score is observed 3 months after the training implementation. These values are based on the WHO data; analogous educational campaigns conducted by the WHO resulted in 17% increase in the knowledge score [5].

Design: quasi-experimental, a pretest-posttest with a control group design will be used for the evaluation.

O_1	X	O_2	O_3	intervention group
O_1		O_2	O_3	control group

O_1 baseline data collection

X intervention

O_2 post-intervention data collection right after the intervention

O_3 post-intervention data collection 3 months after the intervention

Sample size and sampling strategy

Target population is family physicians practicing in Yerevan. The entire target population of 160 physicians will be included in the study. All participants will be chosen from an alphabetical list of family physicians and then randomly assigned to the intervention and control groups. Starting point will be chosen randomly (e.g. by lot), and then every 2nd person will be assigned to intervention group (total 80). The remaining physicians will be assigned to the control group (total 80). Randomization will ensure the comparability of groups. The control group will help to understand if possible changes in knowledge level in the intervention group are due to the implementation or other intervening factors.

Instrument: The measurement instrument will be a self-administered questionnaire (see Attachment 1). The questions will be assessed as right or wrong. Thereafter the percentage of right answers for each question will be scored. The questionnaire includes both close and open-ended questions, and consists of the following parts:

- General questions (3 items)
- Knowledge of the physicians of antibiotics (10 items)
- Knowledge of the family physicians on antimicrobial resistance (6 items)
- Physicians' prescribing habits and practices (10 items)

It is estimated that the completion of questionnaire will take 15-20 minutes. The questionnaire is developed based on two questionnaires. The first one (50-item) was used by the APUA in the survey on the knowledge and prescription practices of antibiotics in Latin America [22]. The second one was developed by the APUA for surveillance of factors influencing physicians to over prescribe antibiotics. Both questionnaires were pretested and validated by the members of the APUA. This modified questionnaire will be pretested on Armenian physicians before starting the program.

Phase 1: Baseline data collection

Participants of the training (intervention-group) can be pre-tested immediately before the starting the program, when all of them are gathered in an auditorium. Such strategy allows collecting data from participants in the intervention group in one day and saving resources. Assistants will obtain data from controls in their offices. This phase will take 5 days.

Phase 2: Post-training data collection 1

The post-test data collection will be conducted immediately after the completion of the program. The instrument used and techniques of collection will be the same as in Phase 1. Data entry of baseline and post-intervention data will also be performed in this phase. This phase will take 15 days.

Phase 3: Post-intervention data collection 2

The second post-test data will be collected 3 months after the training to assess if the gained knowledge is sustainable. The same instrument and data collection techniques will be used. In this stage data collection will take more time than the other phases (20 days) because all family physicians (160 persons) will be working in the field.

Phase 4: Analysis and final report preparation

The program assistants will finish data entry. In the final stage of the evaluation all the collected data will be analyzed and final report will be prepared within 20 days. (For the timeline chart see Attachment 3).

Study limitations

There might be possible threats to internal and external validity.

History will be controlled because both groups are similar.

Maturation should not be a threat, because of the short duration of the program.

Testing may be a threat. The possible changes in the knowledge score could be due to the application of the self-administered questionnaires. Having a comparable control group will help to address this threat.

Instrumentation will be controlled because testing instrument for pre-test and post-tests will be the same. As the questionnaire is self-administered, interviewer bias will be excluded.

Statistical regression will not be a threat because the study population is not selected because of its extreme qualities.

Selection effect will be minimized by random assignment of participant to intervention and control groups.

Attrition effect can be a threat to this study, because participation is voluntary, and there might be differential attrition from the groups. But the program will have a short duration, thus attrition rate could be minimal.

Testing-treatment interaction could not be a threat. The testing procedure is usual and does not involve stress, surprise or deception.

Selection-treatment interaction will be controlled because both experimental and control groups are selected from the same target population.

Multiple treatment effects will be controlled because all participants will be chosen from the same target population. That is why there is high possibility that any other "hidden treatments" will be received both by experimental and control groups.

The exact sample size cannot be estimated for two reasons. First, it is possible that some physicians will refuse to participate. Second, a part of the anticipated participants are still students; it is not possible to know whether they will be working in Yerevan or other place.

BUDGET

The duration of this program is 6 months. The proposed program is going to be implemented through the NIH, Department of Family Medicine. Implementation of all phases requires financial resources, highlighted in the Total Budget Table (See Attachment 4). It includes salaries, operational expenses and training expenses.

Salaries: A program coordinator/manager and 3 assistants will conduct the program. The program coordinator will be responsible for conducting and managing of the entire project; h/she will also analyze the data and prepare the final report. Assistants will perform data collection and data entry, as well as help with the training program.

Accountant specialist will be invited to check the financial reports. An expert educator will train assistants to perform program. Two lecturers will be invited for 5-day training module: one from YSMU and one from the ADMTA.

Operational expenses include the office and auditorium rent. The office should consist of two fully furnished rooms equipped with 2 computers and 1 scanner. Overall, the office will be rented for 3 months. Auditorium will be rented only for 5 days, which is the duration of the training program.

Training expenses include money for copying, expenditure on office supplies (pens, pencils, notebooks, folders, etc) and food for coffee breaks (sandwiches, cakes, coffee, tea, etc.). One questionnaire consists of 5 pages. Five hundred copies should be prepared for the whole program (160x3 +20 extra copies). During the training handouts will be distributed among participants every day, as well as, later among control group (160+10 extra copies). Each handout consists of 5 pages.

All the participants will be supplied by pens (160), notebooks (160) and folders (160). A projector and a laptop will be rented for lectures and presentations for a month.

ETHICAL CONSIDERATIONS/COMMUNITY SUPPORT

The proposal was submitted to the International Review Board on Human Research of the American University of Armenia and received approval. It poses no risk to the participants. The questionnaires are going to be anonymous. They do not contain any sensitive questions. Oral informed consent will be obtained from each participant before enrolment. They will be assured voluntary participation in the program.

The proposed training program is free from any harmful or unethical effects on participants. The main goal of this program is to increase knowledge of family physicians on antibiotics and make them familiar with antibiotic prescription guidelines. Because there is no special classes on this subjects, physicians need such kind of regular training [13]. It will help them to refresh and renew their knowledge, as well as, make them familiar with the current information on antimicrobial resistance.

One thing, which may be considered as an unethical, is the assignment of participants to intervention and control groups. In this case participants of the training will benefit gathering knowledge and materials. To address this issue, educational materials and supplies will also provide the participant in the control group after collecting post-intervention data. If the evaluation shows that the program is effective, it will be implemented for general practitioners in Armenia.

Because there is no special classes on this subjects, physicians need such kind of regular training [13]. It will help them to refresh and renew their knowledge, as well as make them familiar to current information on antimicrobial resistance. The program was introduced to the

Chair of Family Medicine Department at the NIH, and received positive comments. It was suggested to implement analogous educational program among students of the Department.

Antimicrobial resistance was described as a threat to global stability and security, and Armenia is not an exception. Appropriate measures should be implemented to decrease development of resistant pathogens in Armenia. The proposed program will be potential way to combat resistance. This program does not require many resources. It can be implemented among different groups of medical specialists, as there is a lack of accessible and modern information on antimicrobial resistance and standard prescription guidelines [10].

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ATTACHMENTS

ATTACHMENT 1

Questionnaire on the knowledge and prescription practices of antibiotics among family physicians in Yerevan

ID_____

Date of interview (dd/mm/yy) _____

General questions

1. How long have you been practicing as a family medicine doctor? _____

2. Have you ever participated any courses or formal training on antibiotics?
   - ❑ Yes
   - ❑ No

   (If "No" skip the question #3)

3. If "Yes" please describe your last course

Name of the course_____

Place _____

Date and duration_____

Questions on knowledge on antimicrobial drugs

1. Antibiotics are prescribed in case of (check all that apply):
   - ❑ Viral diseases
   - ❑ Bacterial diseases
   - ❑ Parasitic diseases
   - ❑ Fungal diseases
   - ❑ Other_____

2. When is the prescription of Penicillin's is justified?

Please name TWO diseases only.

1. _____

2. _____

3.When is the prescription of Cephalosporins is justified?

Please name TWO diseases only.

1. _____

2. _____

4. When is the prescription of β-Lactams is justified?
Please name TWO infectious diseases only.

1. _____

2. _____

5. When is the prescription of Aminoglycosides is justified?
Please name TWO infectious diseases only.

1. _____

2. _____

6. When is the prescription of Macrolydes is justified?
Please name TWO infectious diseases only.

1. _____

2. _____

7. When is the prescription of Quinolones is justified?
Please name TWO infectious diseases only.

1. _____

2. _____

8. In case of an acute infection caused by a Gram-positive bacterium which antibiotic would you prescribe?
Please name TWO antibiotics only.

1. _____

2. _____

9. In case of an acute infection caused by a Gram-negative bacterium which antibiotic would you prescribe?

Please name TWO antibiotics only.

1. _____

2. _____

10. What are your main sources of information on antibiotics? (Check all that apply)
    - ❑ Scientific journals
    - ❑ Seminars/conferences/trainings
    - ❑ Pharmaceutical industry
    - ❑ Hospital reports
    - ❑ None

Questions on prescribing practices of antibiotics

1. Which factors influence you to prescribe antibiotic? (check all that apply)
    - ❑ Purulent discharge
    - ❑ Fever
    - ❑ Patient demand
    - ❑ Diagnosis/ treatment uncertainty
    - ❑ Other_____

2. What antibiotics do you use most in your daily practice? List only the 2 most common

1. _____

2. _____

3. Do you use any antibiotic for preventive treatment?
    - ❑ Yes
    - ❑ No

4. In general, in which clinical situations, or presence of symptoms, do you prescribe antibiotics?

Please name TWO cases only.

1. _____

2. _____

5. Do you send your patient clinical specimens to be studied for sensitivity of pathogens to different antibiotics?
   - ❑ Yes
   - ❑ No

6. Which criteria do you use to justify the prescription of an antibiotic? (Check all that apply)
   - ❑ Clinical picture
   - ❑ Bacteriological Diagnosis
   - ❑ Antibioticogram (test for sensitivity to antibiotics)
   - ❑ Other_____

7. Do you use antibiotics empirically? ("Empirically" means using clinical judgments based on experience)
   - ❑ Yes
   - ❑ No

8. What antibiotic(s) you don't use in your practice because you know about pathogens resistant to it? List only the 2 antibiotics most frequently known by you

1. _____

2. _____

9. Approximately what percentage of your patients comes to you self-medicated with antibiotics?
   - ❑ <10%
   - ❑ 11-25%
   - ❑ 26-50%
   - ❑ >51%

10. Which 2 antibiotics are the most frequently used by such patients?

1. _____

2. _____

Questions on knowledge of Antimicrobial resistance

1. What is resistance to antibiotics?
   - ❑ It is a type of disease
   - ❑ High sensitivity of pathogen to particular type of antibiotics
   - ❑ Low sensitivity of pathogen to particular type of antibiotics

- ❑ Other_____

2. Antibiotic resistance can be controlled through: (check all that apply)
   - ❑ Decrease of patient demand for antibiotics;
   - ❑ Decrease of inappropriate prescribing of antibiotics;
   - ❑ Development of new antibiotics;
   - ❑ Providing more information on antibiotic resistance patterns to practitioners;
   - ❑ It cannot be controlled

3. Do you periodically or regularly receive information on resistant bacteria specific to your geographical working area?
   - ❑ Yes
   - ❑ No

4a. Do you have written materials for your patients about dosage, adherence and compliance with the antibiotic regimen?
   - ❑ Yes
   - ❑ No

4b If Yes, from whom? _____

5. Do you have written materials on most common infectious diseases and guidelines on its treatment?
   - ❑ Yes
   - ❑ No

6. It would be useful to receive periodic information on antibiotic resistance patterns of common pathogens
   - ❑ Yes
   - ❑ No

YOU JUST FINISH THE QUESTIONNAIRE. THANK YOU VERY MUCH.
We are very appreciative of your time. It is our hope that analysis of results will be useful to implement training program on antibiotics' prescription

ATTACHMENT 2 ***Training curriculum***

Activity	Description	Duration
FIRST DAY		
Introduction	Program coordinator provides goals of training and describes activities	3/4 hour
	Participants complete pretest questionnaire	
Lecture 1	General concept on antimicrobial drugs -Which are antimicrobial drugs -Brief history on development of era of antibiotics -How antibiotic works	1 ½ hour
Coffee break	*¼ hour*	
Lecture 2	Introduction to groups of antibiotics and microorganisms sensitive to each group	1 hour
	Review of distributed "List of essential drugs in Armenia"	½ hour
SECOND DAY		
Lecture 3	Antimicrobial resistance; threats of antimicrobial resistance -What is antimicrobial resistance -Mechanisms of resistant pathogens development -Threats of antimicrobial resistance	1 ½ hour
Coffee break	*¼ hour*	
Lecture 4	Antimicrobial resistance problem in Armenia; identification of potential factors leading to development of antimicrobial resistance	
THIRD DAY		
Lecture 5	Introduction to strategies and guidelines on reducing of antimicrobial resistance developed by different organizations (WHO, CDC and APUA)	1 ½ hour
Coffee break	*¼ hour*	
Lecture 6	Introduction to guidelines on appropriate prescription of antibiotics developed by WHO	1 hour
Discussion	Review and discussion of guidelines	½-1 hour
FOURTH DAY		
Lecture 7	Introduction to standard treatment guidelines developed by WHO	1-1 ½ hour
Coffee break	*¼ hour*	
Discussion	Review and group discussion of standard treatment guidelines	
FIFTH DAY		
Discussion of cases	Group discussion of history cases histories	1-1 ½ hour
Coffee break	*¼ hour*	
Discussion of cases	Group discussion of history cases histories	1 hour
	Participants fulfill posttest questionnaires	¼ hour

ATTACHMENT 3 ***Timeline Chart***

Month in days / *Phases of the program*	*Sep*						*Oct*						*Nov*	*Dec*	*Jan*						*Feb*					
	5	5	5	5	5	5	5	5	5	5	5	5			5	5	5	5	5	5	5	5	5	5	5	5
Pre-intervention																										
-Administrative process																										
-Baseline data collection																										
Intervention																										
Post-intervention data collection 1																										
NO PROGRAM																										
Post-intervention data collection 2																										
Analysis/final report preparation																										

ATTACHMENT 4 *Budget*

TOTAL BUDGET

Description	Total amount in USD
Personnel, experts	8,835
Operational expenses	3,320
Training expenses	510
Unexpected expenses	250
TOTAL	**12,915**

DETAILED BUDGET

Personnel expenses

Personnel	Daily salary in USD	Number of days	Number of units	Total in USD
Program manager	30	90	1	2,700
Program assistant	20+$20 for training	90	3	5,460
Lecturer	25	5	2	250
Trainer	25	5	1	125
Accountant	10	30	1	300
TOTAL				**8,835**

Training expenses

Unit name	Unit cost in USD	Number of units	Total in USD
Duplication of questionnaires	0.02	2500 pages	50
Duplication of handouts	0.02	4250 pages	85
Notebooks	1.0	160 items	160
Pens	0.5	160 items	80
Coffee break	1.5	90 persons	135
TOTAL			**510**

Operational expenses

Unit name	Total cost in USD
Office rent	3,000
Auditorium rent	100
Laptop	30
Projector	30
Communication (phone, Internet)	150
Water, electricity cost	10
TOTAL	**3,320**

APPENDIX