MPH PROJECT

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EVALUATION PLAN FOR PRIMARY MEDICAL CARE IMPROVEMENT PROGRAM IN SEVEN VILLAGES OF MASIS REGION

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<u>Abbreviations</u>

CVD   Cardio Vascular Disease

DD   Diarrhoea

FOP   Feldsher-Obstetric Post

GP/FPh   General practitioner/Family doctor

HAC   Humanitarian Aid committee

HCP   Health Care Provider

HU   Health Unit

MLHCP   Middle level of Health care Provider

MOH   Ministry of Health

NC   Nurse College

NGO   Non Governmental Organisation

NIH   National Institute of Health

ORS   Oral rehydration solution

PHC   Primary Health Care

PHCP   Primary Health Care Provider

PMC   Primary Medical Care

PN   Pediatric nurse

RA   Rural Ambulatory

SMU   State Medical University

SRS   Systematic Random Sampling

UMCOR   United Methodist Committee on Relief

UNHCR   United Nations High Commissioner on Refugees

WB   World Bank

WHO   World Health Organization

GLOSSARY

Primary Health Care: Essential health care made accessible at a cost the country and community can afford with methods that are practical, scientifically sound and socially acceptable. Primary health care is the central function and main focus of a country's health system, the principal vehicle for the delivery of health care, and an integral part of the social and economic development of a country.

Primary Medical Care: A component of primary health care. It consist of first-contact assessment of a patient and the provision of continuing care for a wide range of health concerns. Primary medical care includes the diagnosis, treatment and management of health problems; prevention and health promotion; and ongoing support, with family and community intervention where needed.

General Practitioner/Family Physician: A physician whose tasks are to provide people with comprehensive health care from the beginning of life to death and to advise them on all aspects of health irrespective of age, sex, ethnic group or religious beliefs.

Health Education: Consciously constructed opportunities for learning which are designed to facilitate changes in behaviour towards a pre-determined health goal.

Health Outcome: A change in the current and future health status of a patient that can be attributed to antecedent health care or health policy measures.

Health Promotion: The process of enabling individuals and communities to increase control over the determinants of health and thereby improve their health. An evolving concept that encompasses fostering lifestyles and other social, economic, environmental and personal factors conductive to health.

Health Status: The state of health of a person or a population, assessed by reference to general morbidity, morbidity from particular diseases, impairments, anthropomorphic measurements and mortality, and indicators of functional status and quality of life**.**

1. Abstract

Based on the *Primary Medical Care National Health Reform* program (developed in 1996) primary medical care in Armenia will be improved in the following ways.

1. *Training of primary health care providers (PHCP)*, which will include a) training of general practitioners at the State Medical University (SMU); b) retraining of district therapeutists, district pediatricians, midwives and district nurses at the National Institute of Health (NIH) and c) the training of nurse practitioners and midwives at the Nurse College (NC) #1 (which is the methodological center for other NCs).

2. *Rehabilitation and maintenance of the primary health care (PHC) facilities* by renovation of health units, provision of equipment, medical supplies, essential drugs etc.

3. *Development of clinical practice guidelines* for family practice.

Some non governmental organizations (NGOs) carry out pilot programs in this area (in PHCor/and in PMC), coordinated by Ministry of Health of Armenia.

United Methodist Committee on Relief (UMCOR) non governmental organisation started primary medical care improvement pilot program in August 1997 in seven villages of Masis region: Hayanist, Khachpar, Darbnik, Zorak, Ranchpar, Noramarg, Sayat Nova.. Goal of the program is to improve health status of population living in seven villages of Masis region by decreasing morbidity, mortality and disability.

The program implementation includes: maintenance and rehabilitation of health care units (renovation and reconstruction of those HUs), provision of equipment and medical supply, retraining of middle level health care providers and establishment of revolving drug fund.

Evaluation of improvement of primary medical care (PMC) in those target villages will be based on the specific assessment criteria. This paper is focused on the evaluation of the performance skills (for diarrhoea management) of paediatric nurses at the primary health care level. This program hopes to improve case management performed by paediatric nurses. Five objectives detailed below will be evaluated according to the evaluation plan. All these five objectives are important, but the purpose of this paper is to give detailed description of evaluation plan for objective 4. To achieve that objective three-month special retraining courses will be organized. One month before program implementation assessment of performance of paediatric nurses (pretest) by record review was made. After six months of program implementation the second assessment (post test) will be made and the results of two assessments will be compared. Analysis of the program will be based on estimation of statistical significance. The study power is calculated.

2. Introduction

2.1 Situation Analysis

Armenian health services are organised along the line of the Semashko model with "first level" primary medical care (PMC) services available on a territorial/geographic basis (1). The emphasis is on services focused on diagnosis and treatment of diseases and provided by a range of speciality medical practitioners including general medicine, general paediatrics, specialised paediatrics, obstetrics/gynaecology, surgery etc. Today there are approximately 12,850 physicians and 9,555 of those practice in clinical medicine. Armenia has a physician to population ration of 34.5: 10 000. In Yerevan this ration is 39.6 per 10 000 population. There are 81 narrow specialities in Armenia (2).

One of the most significant characteristics of the previous health care system was the preparation of large number of specialist physicians (1).The resulted in oversupply of physicians and increase of unemployment rate among them. To solve this problem in 1996 Ministry of Health (MOH) decreased the number of state funded students admitted to State Medical University (SMU). But the goal was not achieved because of the increasing number of both "private pay" students in SMU and the newly opened private medical schools (3). This increase does not accord with the increase of number of population (1991 it was 3642.4 in 1996 it was 3780.7, when suspected date is much less than 3 000 for 1996). Natural growth decreased from 15.1 in 1991 to 7.1 in 1994 (2).

The emphasis of the Armenian health care system is on quantity and not quality of treatment services. Health care system is oversized, but at the same time the system is not able to provide quality health care for Armenian population and improve their health status. Average life expectancy at birth in 1993 was 67.9 for men and 74.4 for women. The life expectancy at 30 has been declining, in 1993 being 41. 0 for men, and 46.4 for women compared with 43.3 for men and 49.2 for women in 1980. This trend indicates the worsening health status of adult population (4, 5).

Utilisation of primary medical care units in Armenia.

The main functions of primary medical care (PMC) are: disease prevention, health promotion and early detection of disease, treatment of common diseases and rehabilitation (6). There are 499 primary

health care units (PHCUs) in Armenia. Types of PHCUs are: for urban area *polyclinic*, for rural area *feldsher-obstetrical post* (FOP) and *rural ambulatory* (RA). There is a decline in outpatient services from 10.5 visit per person in 1965 to 5.0 in 1994 and for home visits from 0.8 per person in 1985 to 0.33 in 1994 (7).

The mortality rate of people with cardio vascular disease (CVD) increased from 294.84 (per 100 000 population) in 1988 to 351.17 in 1996. The mortality rate of people with the diabetes increased from 11.72 (per 100 000 population) in 1988 to 28.03 in 1996 according to data from the MOH statistical department. However the morbidity rate decreased from 1312.5 in 1988 to 734.7 in 1996 for all CVD. For diabetes morbidity rate decreased from 136.9 in 1988 to 73.7 in 1996. The decreasing morbidity rates and the increasing mortality rates may indicate low quality of PMC (poor detection of CVD and diabetes) and decreasing of accessibility of PMC (2).

There are many negative factors, which are the main challenges facing Armenia in the area of primary medical care reform (8). PMC in Armenia emphasizes treatment of illness and gives insufficient attention to health promotion and disease prevention activities. Population lacks individual responsibility for their own health. There were financial informal barriers (now there are financial formal barriers too) to get PMC such as informal fees, plus costs of medicines. There is a low quality of "first level" services (4,7,9) and at the same time an over supply of physician specialists and lack of general practitioners (GP)/family doctors (FD).There is an oversupply of district therapeutists and district paediatricians, but there is no GP or FD as a specialisation in Armenia.

Another negative factor is the inefficient use of scarce resources and inadequate programming in health education. There is a lack of health care planning, lack of minimum PMC health service standards/ guidelines. PMC units need to be renovated and restructured, but they are still used (continuing use of inappropriate facilities). PMC units need to be equipped, because there is lack of appropriate "first level" equipment*. There is no developed community component in "first level" health services. There are inadequate "first level" services for the elderly (gerontology, geriatric). There is international aid on the

health care area, but there is no sustainability of the programme initiatives supported by international aid e.g. immunisation (7).

It is obvious that Armenian health care system should be improved. These health care changes - health care reforms should stress the improvement in the primary health care area.

2. 2 Health Care Reform

Since 1992 Armenian Government has started to work on health reforms. In 1992 *Law of Ensuring Sanitary Epidemiological Security of the Population of the Republic of Armenia* was approved. In 1995 the MOH of Armenia approved the *Program on the Development and Reform of the Health System of the Republic of Armenia 1996-2000.* Taking into account the experience of developed countries that has reached high level of primary health care, the MOH of Armenia has decided to adopt health strategy centered around primary health care. In 1995 the National Institute of Health (NIH) prepared a draft document entitled *The Reform of Primary Health Care in Armenia*, which was revised in early 1996. The reforms are intended to facilitate equitable, and effective utilization of the resources available to respond to the Armenian population's main health needs and problems.

In 1996 working groups consisting of local and international experts were formed. The results of the work is *Primary Medical Care National Health Reform Program.* Based on this program primary medical care will be improved in the following ways.

1. *Training of PMC providers*, which will include a) training of general practitioners at the SMU; b) retraining of district therapeutists, district pediatricians, midwives and district nurses at the NIH and c) the training of nurse practitioners and midwives at the Nurse College (NC) #1 (which is the methodological center for other NCs).

2. *Rehabilitation and maintenance of the primary health care (PHC) facilities* by renovation of health units, provision of equipment, medical supplies, essential drugs etc.

3. *Development of clinical practice guidelines* for family practice.

Based on the Armenian National Health Strategy in the primary medical care level a well trained team will work: general practitioner, general practitioner paediatrician, two nurse practitioners (for adult and for child care), midwife. Further the team will involve a social worker and a stomatologist.

Some non governmental organizations (NGOs) carry out pilot programs in this area (in PHCor/and in PMC), which are coordinated by Ministry of Health of Armenia.

3 Background

3.1 Literature Review

3.1.1 Evaluation of Health Care Services.

Evaluation analysis of health care services can be made through analysis of separate parts. These parts are: *structure, process, outcome or process, impact, outcome* as parts of health care services (10,11,12). Vahe Kazanchian, who has developed tools for health care quality assessment both for inpatient and outpatient health care, emphasized like Donabedian the significance of "process of health care" as a primary object of assessment (13,14). Donabedian underlines two other components, structure and outcome, also as important elements for measuring and assessing the quality, although less directly.

3.1.2 Health care structure and process analysis

Structure assessment of medical care reflecting the medical staffing, facilities, equipment, medical instruments and materials, funds etc. Structure is an important part of health care services, but without appropriate process it can not be transmitted to the activities: into *process* components (15). In order to improve process it is necessary to have well trained health staff: PHC providers. For this a good educational system with the basic education as well as with postgraduate and continuing education is needed. Educational system, especially post graduate and continuing training parts should have an objective to see improving in performance of health care providers besides improving their knowledge. Retrainng programs are the main tools for improvement of knowledge and performance of the currently working health staff. In primary health care it is important to have well educated middle level health care

providers. "The quality of nurse practitioners care is equivalent to physicians' care within their area of competence. Further, they are better than physicians at providing services which depend on communication with patients and preventive action" (16).

3.1.3 Measurement of quality of care and data sources

Process evaluation shows the activity of the potential. Activity should be measured by process elements and the potential should be measured by structured elements. It is very important that change in process indicators is correlated with improvement in outcome. The process evaluation, is manifested in literature as a direct measuring of quality of care.

Performance of health care providers including case management is a health care process. For measuring quality of the health care process different types of measurement can be used based on different types of criteria. Different types of measures-criteria can be divided into two groups: a) obvious or explicit criteria and b) not obvious or implicit criteria. Explicit criteria are appropriate measures for the assessment of the health care providers performance (13) and they are: objective, uniform, acceptable, verifiable etc.. For assessment of the performance the results of 1) interview with patients 2) interview with the health care providers 3) direct observation , review of audiotapes or videotapes or literal transcript and 4) record review can be used. All these types of assessment measures can be used separately or in combination in order to obtain a comprehensive picture about the quality of the health care (10,17). Choice of the best data source for a given study will depend on many factors, including the setting, available resources, and the type of information sought. Record review is the most effective data collection method for measurement of appropriate prescribing and for measurement of case management for a certain time period (10), while direct observation and interview with patient are equally effective in assessing criteria related to physical examination, advising the patient. Record audit compared with the direct observation has the following advantages: it is cheaper and less time consuming. Compared with the other tools (interview with the patients and with the health care providers) it is more valuable and objective.

For primary health care team performance assessment different types of checklists have been developed by the record review. (17).

3.1.4 Evaluation of the outcome of health services

Evaluation of the *outcome* of medical care should be the final step of program evaluation. Outcome evaluation includes assessment of health status of population. For project conducted in a short period of time it is not reasonable to assess health status of population, because outcome evaluation may not show meaningful outcome improvement due to program implementation (18). Outcome evaluation may not show meaningful results, because health status of patients depends not only on medical care, but also on social and physical environment, on human biology, which can not be changed in a short period of time (6).

For the evaluation of PHC/PMC services many evaluators put sign of equity between PMC and family medicine, and based on the unique features of this discipline evaluate PMC. Those features are: g*enerality, accessibility, complex approach, sustainability, team approach, entirety, individual approach, family context , social context, coordination,* c*onfidentiality, advocacy (19,20,21,22).*

3.2 Program description

United Methodist Committee on Relief (UMCOR) non governmental organization carries out Improvement of Primary Medical Care program in Masis region. Within the scope of this program UMCOR has conducted health needs assessment research in seven villages of Masis region: Hayanist, Khachpar, Darbnik, Zorak, Ranchpar, Noramarg, Sayat Nova (see attachment VI) (23,24,25,26,27,28,29). Ninety percent of population in those villages are refugees* who have been displaced without adequate income for a long time and are faced with a complex series of factors, which threaten their health.

The aim of this program is to promote primary medical care in seven villages of Masis region by renovating rural PMC units (RA and FOP), retraining middle level health care providers and supplying

pharmaceutical and medical supplies for free distribution to 10,000 people. UMCOR began a program in August 1997.

The program targets seven villages of Masis region (Ararat marz) for five months of program implementation. The program consists of the following components: renovation of facilities; reconstruction of health unit buildings; provision of appropriate infrastructure (sewage system, water supply etc.); provision of medical equipment**, diagnostic and treating materials and medication; provision of furniture and stationery, retraining of middle level health care providers; and establishment of a revolving drug fund (RDF)***. For needs assessment many tools were developed: observational checklists, questionnaires (see attachments I,II,III,IV and V). For retraining program a curriculum was developed (see attachment VII). Assessment of knowledge of middle level health care providers was made before program implementation (see attachment VIII).

Refugees are Armenian people emigrated from Azerbadjan after Nagorno Karabax-Azerbadjan conflict in 1987-1988.
*** There is an international standard for those type of equipment. It includes sphygmomanometer, stethoscope, thermometer, antropometric measurement instrument, electrocardiograph machine, kit for otorinolaringology, equipment for laboratory testing of blood and urine etc.*
****RDF is a insurance drug fund which will generate money to replenish the initial stock of medicines.*

Organizations and institutions participating in implementation of the program are:

- (*UMCOR) medical team* - responsible for management of PMC improvement program including needs assessment study. UMCOR intends to purchase essential medicines and medical supplies designed to be used in rural health units.

- *United Nations High Commissioner on Refugees (UNHCR) Echmiadzin field office* - responsible for evaluation of the whole program.

- *SMU, NIH, NC* - The NIH consultant designed and managed the needs assessment study and developed retraining program, including curriculum, schedule etc.. Those three institutions provide qualified teachers for retraining program of middle level health care providers (MLHCP).

- *Ahazang NGO* - physicians from this organization conducted the needs assessment survey (by interviewing residents of villages). This organization is partially responsible for data collection.

3.3 Program objectives

Primary medical care improvement program in seven villages of Masis region has many objectives and reaching of those objectives becomes indicator for program assessment. Some of objectives are related to the structural issue (PHC structure evaluation), some of them are related to the process of health care (PHC process evaluation). The goal of the program relates to the outcome of health care (outcome evaluation).

PROGRAM GOAL

The goal of this program is to improve health status of population living in seven villages of Masis region by decreasing morbidity, mortality and disability.

The health status of population will be improved if health providers provide better health care, which includes appropriate case management. For that reason first of all their knowledge should be improved, but improving of knowledge does not mean improving of behaviour. For better performance (case management) it is important to achieve behavioural changing, that is why it was chosen for evaluation of performance of health care providers (see objective #4).

OBJECTIVES

Objective #1

1 month after program implementation primary health units functioning capacity (building, equipment, medical supplies, essential drugs) will be improved by 63% (reaching 90%), compared with functioning capacity 2 months before program implementation.

Indicator: Mean of the proportion of existing items (building, capacity etc.) with the total items on the checklist (mean for seven health care units). A list of equipment and medical instruments needed for PHC units functioning by MOH is developed (see attachment IX).

Numerator: mean of existing number of items.

Denominator: Total items on checklist.

Objective #2

Immediately after finishing retraining program (11 of November 1997) the mean knowledge of middle level health care providers will be increased by 26 % (reaching 80%) compared with the knowledge of MLHCP 1 month before program implementation.

Indicator: mean test score.

Nominator: sum of providers' test scores.

Denominator: number of providers.

Objective # 3

6 months after program implementation the number of paediatric nurses performing diarrhoea management will be increased by 30% (reaching in average 80%) compared with the number of PN performing diarrhoea management 1 month before program implementation.

Indicator: proportion of PN have performed diarrhoea management.

Nominator: number of PN have performed diarrhoea management records.

Denominator: total number of PN.

Objective # 4

6 month after program implementation the providers performance index (PPIpost) will be increased by 4.25 compared with the providers performance index (PPIpre) 1 month before program implementation.

Indicator: providers performance index.

For assessment of diarrhoea management checklist for record review is used, which consists of 19 items. The PPI of completed items will be calculated during pre and post test and the difference between two PPI will be estimated (for more details see page 19).

Objective #5

To establish a Revolving Drug Fund in each village (100%). This will generate money to replenish the initial stock of medicines.

Indicator: proportion of villages with functioning RDF.

Nominator: # of villages with functioning RDF.

Denominator: total # of villages.

Considering that all five objectives mentioned above are important for evaluation of the "PMC Improvement" program, the purpose of this paper is to give a detailed description of an evaluation plan for objective # 4, because objective # 4 is related to the performance skills of the MLHCP which is important measure for the impact of the implemented program.
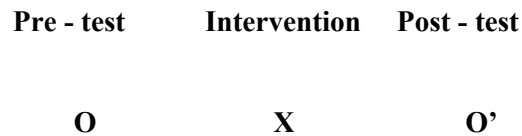
VARIABLE	SOURCE OF DATA FOR VARIABLE	WHEN TO MEASURE	HOW OFTEN
Independent Retraining program	existed program	September 18, 1997 November 1, 1997	once
Dependent MLHCP (with improved skills for case management)	Record Review	on September 4-5, 1997 and June 1, 1998	twice: before program implementation and six months after that.

4. Methods

4.1 Study Design

The remainder of this paper will focus on the evaluation of objective # 4 , which is related to the performance skills (case management) of paediatric nurses on the PHC level. In order to assess the impact of the program, it is proposed to use the pre-post test method. Therefore, the data about performance of paediatric nurses will be gathered before and after program implementation.

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Figure 1. Paediatric nurses' performance evaluation design

<div align="center">

Pre - test   Intervention   Post - test

O X O'

</div>

where O is paediatric nurses with performance practice in target villages before intervention, O'is paediatric nurses with performance practice in a target villages after intervention and X is the intervention (retraining program) (30). According to objective 4, the difference between the providers performance indexes before and after implementation shall be 4.25.

Intervention population: paediatric nurses of seven health units (HUs) of Masis region: Hayanist, Khachpar, Darbnik, Zorak, Ranchpar, Noramarg and Sayat Nova.

Comparison population: (there is no control group).

Inclusion criteria: a) paediatric nurses started to work in target HUs before August 4 (09/04/97 retraining program started), b) who were not on maternity leave (one nurse was on maternity leave and did not participate in the retraining program).

4.1.1 Strengths/Limitation of Design

The strengths and limitation of design depend on level of internal and external validity. The more are threats to both external and internal validity within design, the more are the limitation. Finally concluded evaluation results become less important. To strengthen the further evaluation of the program impact the internal validity of the design should be anticipated.

The external validity of design reflects the generalizability or representativness of results.

Table I. Threats to internal validity

Threats to internal validity	Present	Absent	Why ?
1. History	X		Other programs related to the PHC/PMC implementing in the those target villages should be taken into account. Co-ordination of all such types of programs by MOH of Armenia will exclude the duplication of the programs in this area. Anyway it can be historical impact. PHC units can be privatized, but the probability is very low that it will effect the assessment of performance.
2. Maturation		X	Due to the short time period between assessments, it is unlikely that maturation (biological or psychological) will have significant threat to validity
3. Pre-testing procedures		X	Pre - testing will be done by record review (by checklist) which will be completed by experts. This procedure is not source for learning.
4. Measuring instruments		X	The same instruments (checklist for record review) and the same observers will provide the first and the second measurements.
5. Statistical regression		X	Groups are not selected on the basis of extreme scores. All paediatric nurses of the seven health units were selected.
6. Differential selection of subjects		X	There is no comparison group and all nurses are involved in the program.
7. Attrition			Paediatric nurses can be fired or can migrate to other places. There are only eight nurses and attrition rate can influence the

	X		final result: by which direction it depends on who will leave: providers with "bad" or "good" performance results.
8. Interaction with selection		X	Interaction effects between the mentioned variables is not anticipated.

Table II. Threats to external validity

Threats to external validity	Present	Absent	Why ?
1. Interaction of testing		X	For assessment of performance record review with the structured checklist is used, and nurses do not know about this checklist and do not know about any items on the checklist. They get appropriate skills for diarrhoea case management from retraining course only.
2. Interaction of selection		X	The outcomes of the program are relevant not only to population from which study groups were selected, but also to population of the whole country. Program achievements are generalizable.
3. Reactive arrangements (situational effects of assessment procedure)		X	There can be reactivity during record review procedure, but it can not effect the quality of the already performed diarrhoea case management. It means that assessment results are out of situational effects of assessment procedure.
4. Multiple Interference		X	Program is co-ordinated by department of foreign affairs and humanitarian aid of MOH of Armenia, and implementation of other PHC/PMC programs in those target villages of Masis region is not anticipated.

Some study revealed that in rural setting, the use of the record review to identify quality of care, is highly sensitive: Unperformed action is almost certainly not recorded, and performed action is recorded occasionally (10).

Within the evaluation of the process (performance assessment) it is necessary to achieve high degree of reliability of both measurement process (record review procedure) and measuring instrument (checklist). It is important to take into account those possible sources of low reliability and try to avoid them.

Sources of low reliability   **Measures to avoid them**

1. Instrument   a) checklist easy to complete; b) it was used in 1996 by NIH for assessment of health care providers performance in five marzes of Armenia (pre-tested instrument); c) It was adopted for assessment of paediatric nurses' performance; d) the same instrument should be used for pre and post testing.

2. Observers   a) they are well trained physicians and public health professionals; b) they are loyal persons and are not interested in the results of assessment; c) they should strongly follow the guidelines of assessment procedure. d) it is preferable to have the same observers before and after program implementation.

3. Source of information   The "patient records" are source for performance assessment. Reaching of all "patient records" for chosen time period is very important (sometimes these records are given to patients for keeping at home). It should be reached by order of head of health units to keep all "patient records" at health units.

4. Procedure   Record review procedure should have guidelines.

5. Situation   Try to review the records in convenient conditions.

4.2 Setting, data sources, instruments

For assessment of performance of paediatric nurses it was initially decided to make direct observation, which is the most objective and valuable tool for assessment of performance. Three days (during health needs assessment) no patient was found in health units. Based on the result of health needs assessment study for the last three months there were no visits to the health units. Since July 1997, utilisation of health units dramatically has decreased, because the new fee for services approach was implemented besides the services paid by government (basic benefit package). That is why it was decided to assess performance by records review. Besides it, record review is the effective data collection method for measurement of case management for a certain time period and compared with the direct observation it is cheaper and less time consuming..

For assessment of performance diarrhoea case management was chosen for three months duration. Record review (pre test) was done in September 4,5 and the last three months were June, July and August.

For the record review the special checklist was developed based on the developed checklist by NIH.

4.2.1 Validity and reliability of checklist

The pre-testing of checklist (any measure) will allow to have highly reliable data. The checklist for assessment of nurse performance was used in 1996 by NIH in five marzes of Armenia (pre-tested instrument). It was adopted for assessment of paediatric nurses' performance. The same checklist for record review will be used for pre and post testing.

Designed checklist for assessment of diarrhoea case management consists of 19 items. Those items could be divided into the following groups: a) questions related to the personal data; b) questions related to the complaint of patient and subjective symptoms (it can be done by the parents of child); c) questions related to the objective status of child; d) questions related to the treatment and finally; e)

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questions related to the follow-up approach (see attachment IV). Having all points mentioned above it is easy to assess quality of health care.

4.2.2 Record review procedure

The checklist easy to complete: in front of each item on the checklist it was mentioned if it was completed (Yes) or not (No). If it was completed incorrectly or it was not completed it was mentioned - signed (No), fact was interpreted as having lack of case management skills.

Records review was done in seven health units of seven villages of Masis region. "Patient records"(record keeping special form for each patient) become sources for information.

For each nurse 15 "patient records" were reviewed. In order to increase the precision of calculated PPI, 15 records are taken as a minimal expectable number for assessment of performance of health care providers (discussion with Dr. Reinke - professor of the Department of International Health of Johns Hopkins University, School of Hygiene and Public Health).

From all patients records (patients having diarrhoea case during three months) the necessary sample was picked up taking into account a) that 15 records should be reviewed for each PN; b) total number of records for three months period for each PN. The step (K) for each PN records sampled was calculated.

	PN1	PN2	PN3	PN4	PN5	PN6	PN7	PN8
# of records (N)	40	28	16	27	30	45	48	35
#of reviewed records (n)	15	15	15	15	15	15	15	15
Step (K= N/n)	3	2	1	2	2	3	3	2

Note: Four PN have not performed diarrhoea case management (the mean score of those PN is 0), but from the health unit's general journal number of cases (N) was taken.

4.3 Sample size

Objective # 4 is: 6 month after program implementation the providers performance index (PPI post) will be increased by 4.25 compared with the providers performance index (PPI pre) 1 month before program implementation.

Indicator: providers performance index (PPI).

For assessment of diarrhoea management checklist for record review is used, which consists of 19 items. For each provider the PPI of completed items will be calculated during pre and post test (15 records for each PN),from which an overall PPI will be calculated.

For evaluation of this objective it is necessary to calculate the theoretical sample size (theoretical, because we have already defined sample size and it equals eight paediatric nurses). For sample size calculation it is important to have difference between PPI before and after program implementation (ΔPPI).

The general picture of the assessment before program implementation is the following.

	PN1	PN2	PN3	PN4	PN5	PN6	PN7	PN8	
PPIpre	4	7	5	6	0	0	0	0	PPI = 2.75 (before program implementation)
PPIpost									expected PPI is 7.0 (after program implementation)

PPI is the provider performance index: mean (4, 7, 5, 6, 0 , 0, 0 ,0) of completed items for each paediatric nurse. As it was mentioned above for each PN it was reviewed 15 records.This means that for PN1 PPI (mean of completed items) equals 4, which was calculated by adding (S1 + S2 + ... S15)/ 15, where S1, S2 ......S15 are number of completed items (correctly completed) based on "patient record" 1, "patient record" 2 "patient record" 3........ "patient record" 15. Fifteen "patient record" were reviewed for each provider. Four out of eight nurses trained in the program practice diarrhoea management at baseline. For eight nurses PPIpre of completed items is 2.75 (before program implementation). It is anticipated to have increasing of PPI by 4.25 after program implementation, which means that PPIpost will equal 7.0. Note: PPIpre is a mean of means of completed items for eight PN before program implementation. PPIpost is a mean of means of completed items for eight PN after program implementation and ΔPPI is a difference between means of means before and after program implementation (ΔPPI = PPIpost - PPIpre)

The sample size necessary to detect this ΔPPI can be calculated as follows:

$$n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 \times 2\,\sigma^2}{\Delta^2}$$

where $Z_{1-\alpha/2} = 1.64$ (for $\alpha = 0.05$), $Z_{1-\beta} = 0.84$ (for 80% power)

$Z_{1-\alpha/2}$ (one-sided)   and $Z_{1-\beta}$(one-sided)

σ   is the standard deviation: range/6 is a one way of estimating standard deviation, when it is

unknown.

σ = 2.5 (possible range is 15 and 15/6 = 2.5);   Δ = 7.0 - 2.75 = 4.25 (difference between

means)

$$n = \frac{(1.64 + 0.84)^2 \times 2\,(2.5)^2}{(4.25)^2} = \frac{76.9}{18.1} = 4$$

It means that n= 4 nurses and this sample size is sufficient to detect the anticipated ΔPPI.

4.4 Analysis

Only four paediatric nurses keep the records related to diarrhoea (in all those cases, where records

were not found, it was interpreted as absence of diarrhoea management). Nurses generally complete

items related to the name and age of patients, their complaint and name of medications prescribed for

treatment.

For final analysis of the data gathered from pre and post tests PPI of completed items for each

paediatric nurse will be used and based on that the sum of PPI will be calculated. There is a PPI before

program implementation and it equals 2. 75. Completed record's items for those who do not keep the

medical records equal 0. After program implementation the PPI of completed items will be calculated.

All gathered data will be designed on the following table.

	PN1	PN2	PN3	PN4	PN5	PN6	PN7	PN8	
PPI pre	4	7	5	6	0	0	0	0	PPI = 2.75(before)
	?	?	?	?	?	?	?	?	PPI = ? (after program

PPI post									implementation)
ΔPPI	? - 4	? - 7	? - 5	? - 6	?	?	?	?	ΔPPI=PPIpost - PPIpre

After program implementation ΔPPI will be calculated. ΔPPI is the sum of ΔPPI for each PN divided to eight (ΔPPI1 + ΔPPI2 + ΔPPI3 + ... ΔPPI8)/8.

As it was mentioned above there is a defined sample size and it equals eight paediatric nurses. Power = $1-\beta$ or 1- probability of correctly concluding that there is difference between PPI of completed items. Power of this study (assessment of performance) tells us how likely the study is to correctly identify a difference between the PPI of completed items, if in reality they are different.

For this sample size the power of the study can be calculated.

$$(Z_{1-\alpha/2} + Z_{1-\beta})^2 = (n \times \Delta^2)/2\,\sigma^2$$

where $Z_{1-\alpha/2} = 1.64$ (for $\alpha = 0.05$), $Z_{1-\beta} = 0.84$ (for 80% power)

for $Z_{1-\alpha/2}$ and $Z_{1-\beta}$ (one-sided)

$\sigma = 2.5$ (possible range is 15 and 15/6 = 2.5); $\Delta = 7.0 - 2.75 = 4.25$ (difference between means)

$$(Z_{1-\alpha/2} + Z_{1-\beta})^2 = 144.5/12.5 = 11.56$$

$Z_{1-\beta} = 3.4 - 1.64 = 1.76$ (which is accorded to the power equal 90% and this value is > 80%).

The analysis of the data can be framed as follow:

Evaluation Question	Is there difference between performance PPIs before and after program implementation ?
Independent variable	Retraining program
Measurement scale	Nominal
Dependent variable	Performance of PN
Measurement scale	Continuous
Analytical technique	paired t - test

Statistical - testing the hypothesis and calculating p- value

Assessment of performance of the sum eight PN will be done before and after program implementation. It means that the data are paired. A hypothesis used the paired data is known as a paired comparisons test.

The objective in paired comparisons tests is to eliminate a maximum number of sources of extraneous variation by making the pairs similar with respect to as many variables as possible.

Null hypothesis - Ho: There is no difference between PPI before and after program implementation.

Alternative hypothesis - HA: There is a difference between PPI before and after program implementation.

$$Ho: \Delta PPI = 0$$

$$HA: \Delta PPI > 0$$

We will say that sufficient evidence is provided for us to conclude that the retraining program is effective if we can reject the null hypothesis that the ΔPPI is 0 and accept HA hypothesis that ΔPPI is > 0.

As it was mentioned above as a analytical technique paired t -test will be used.

$$t = \frac{\Delta PPI}{\sqrt{\sigma^2/n}}$$

Decision Rule: If p-value is = or < 0.05, it means that the ΔPPI is considered to be statisticaly significant and we can reject the Ho hypothesis and accept HA hypothesis.

5. Budget (refer to the detailed budget for whole program - attachment X), time - table

5.1 Budget

For evaluation of the primary medical improvement program it is needed personnel, fund and time.

UMCOR has already facility, equipment and transportation to conduct pre and post tests and monitor the implementation program.

Additional temporary staff for the program evaluation were hired by UMCOR.

1. Two persons for program monitoring and for assessment of performance of PN;

2. Consultant for curriculum development and for checklist developing.

Budget needed for evaluation of the program

Items	Unit cost	Number of units	Total cost
PERSONNEL			
• 2 program monitor	$450	6 person/month	$2700
• 1 consultant	$300	1person/ month	$300
TRANSPORTATION			
• vehicle maintenance			$300
EQUIPMENT AND SUPPLIES			
• stationary			$500
TOTAL			**$3 800**

5.2 Time table

Duration of the whole program is: August 1 to December 31

First assessment (pre test) of performance of paediatric nurses was done 1 month before program

implementation: in August 4-5, 1997. The retraining program will last from September 18 to November

11, 1997 and the second needs assessment (post test) of performance of PN will be in June 1998.

6. Political constraint and ethical considerations

This program is in coordination with the general National policy of Ministry of Health of

Armenia and it does not represent contradiction between mission of governmental and non governmental

structures. Resistance from MOH is not anticipated; moreover, they welcome this program and wish to

use result of the pilot program for implementation in the other regions of Armenia. The proposed program

has been discussed and approved by the Minister and Deputy Minister of Health on July 3, 1997.

UMCOR has signed a cooperative agreement with the MOH and Humanitarian Assistance Committee

(HAC) on the program implementation.

District nurses (nurses practitioners) in Armenia need to be retrained. Middle level health care providers in those target villages of Masis region have in average 25 years work experience, but were never retrained and they welcome this retraining courses and actively participate in it. In their words: "It is not only a chance to be retrained and improve our professional skills, but also an opportunity to realize that we are involved in the active life of the country and feel more comfortable as a human being". Participation in the retraining course was not compulsory, but voluntary.

Household survey with residents of villages was conducted for health needs assessment, using as a tool the well pre - tested questionnaire. During the survey privacy, confidentiality were taken into consideration.

Confidentiality of the results of assessment of PN performance as well as the results of assessment of their knowledge were provided. After retraining course each middle level health care provider will receive certificates with attached grades sheet.

Although the access to the patients records was very easy, the names of patients were not fixed in the checklist.

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7. References

1. Attachment of Order # 1000 Minister of Health USSR of 23 September 1981;

2. Center diseases Control of RA, Annual report, 1996;

3. Department of prevention and General Medicine of MOH RA. Annual data report 1997;

4. Armenia - Health Status, Access to Health Services, and PH and PHC issues Toomas Palu, EC4MS, July 15- 27, 1995;

5. *A Qualitative Assessment of the living Standards of the Armenian Population*. October 1994 - March 1995, by Nora Dudwick, Washington D. C. 20052, June1995;

6. Primary Care. Barbara Starfield, concept, evaluation and policy. 1992, New York;

7. World Bank (WB) Consultant, T. Palu July Mission 1995 technical notes;

8. *Primary Health Care Reform* July 1996, prepared by Canadian Resource Management Consultants (RMC);

9. WB consultant, Mary E. Schmidt, 1996, notes;

10. Hermida, J. et al. *Comparative Validity of Three Methods for Assessment of the Quality of Primary Health Care: Guatemala Field Study*. Quality Assurance Methodology refinement Series, Quality;

11. Assurance Project, Center for Human Services, Bethesda, Maryland 1996;

12. Palmer, R.H. et al. A Method for Evaluation Performance of Ambulatory Paediatric Tasks. *Paediatrics* **73**(3) 269-277, 1984;

13. Donabedian, A. *The Criteria and Standards of Quality*. Ann Arbor, Michigan; Health Administration Press, 1982;

14. Donabedian, A. *The Methods and Findings of Quality Assessment and Monitoring: An Illustrated Analysis*. Ann Arbor, Michigan: Health Administration Press, 1985;

15. Payne B. C. et al. *The Quality of Medical Care*: Evaluation and Improvement. Chicago: Hospital Research and Educational Trust, 1976;

16. Department of Health and Human Services, Office of Inspector General, *"A Survey of Certified Nurse-Midwives"*, March 1992, p. F-2;
17. Robert Taylor. *Family Medicine rinciples and practice*. 1993;

18. Tarlov AR, Ware JE, Greenfield S. The medical outcomes study: an application of methods for monitoring the results of medical care. *JAMA* 1989; **262**; 925-30;

19. New challenges for Public Health, report of an interregional meeting, Geneva, 27-30 November 1995, WHO Geneva 1996;

20. *A preventive strategy for Public Health*. Ministry of Health, Welfare and Cultural Affairs, Rijswijk, The Netherlands, 1993;

21. A report on the multiple roles of the family physician in the Canadian health care system. The family physician as primary health care provider. ISBN 0 921413-79-3;

22. *Family Practice Development Strategies*. Report on the second WHO Meeting of the Expert Network Warsaw, Poland 23-25 October 1995, 1996;

23. Regent Park Community Health Centre, *needs assessment study*, May 1990, Canada, Toronto;

24. Bentley, M. E., Boot, M.T., Gittelsohn, J. and Stalling, R.Y. (1994). *The use of structured observations in the study of health behaviour*. Occasional Paper No. 27, IRC International Water and Sanitation Centre, The Hague, The Netherlands;

25. Pope C, Mays N. *Reaching the parts other methods can not reach*: an introduction to qualitative methods in health and health service research. BMJ 1995; 311:42-5;

26. Denzin NK, Lincoln YS. eds. *Handbook of qualitative research*. London: Sage Publications, 1994;

27. Taylor ST, Bogdan R: *Introduction to Qualitative Research Methods: The search for Meanings (2nd ed.)*. New York, Wiley-Interscience, 1984;

28. Van Maanen J: *Qualitative Methodology*. Beverly Hills, CA, Sage, 1979;

29. Lofland J: *Analysing Social Settings: A Guide to Qualitative Observation and Analysis*. Belmont, CA, Wadsworth, 1971;

30. Adapted in part from Van Dalen, D. B. *Understanding educational research* (4th ed.) New York McGraw Hill, 1979. Adapted from Campbell, D.T., and Stanley, I.C.,*Experimental and quazi-experimental designs for research,* Rand McNallyand Company, Chicago, 1966.