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QUETZALTENANGO
MATERNAL NEONATAL HEALTH PROJECT
INCAP

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ACRONYMS

AID	Agency for International Development/Washington
DHS	Demographic Health Survey
GOG	Government of Guatemala
INCAP	Instituto de Nutricion de Centro America y Panama
IMR	Infant Mortality Rate
LBW	Low Birth Weight
MCH	Maternal and Child Health
MOH	Ministry of Health
PAHO	Pan American Health Organization
ROCAP	AID Regional Office for Central American Programs
TA	Technical Assistance
TBA	Traditional Birth Attendant (Partera/Comadrona)
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development/Guatemala
WHO	World Health Organization

EXECUTIVE SUMMARY

Despite the fact that maternal deaths, and intrapartum, neonatal and early post-neonatal mortality represent the major categories of deaths in infants and women of fertile age in the region, these areas have received little programatic attention compared to other health problems such as diarrhea and vaccine-preventable diseases. Recent investigations have shown that in Guatemala, close to 50% of all infant mortality occurs before the age of one month. A recent INCAP survey of MOH hospitals showed an institutional maternal mortality rate of approximately 220 per 100,000 live births. The inclusion of unreported maternal deaths in the community would undoubtedly result in an even higher rate. As a basis of comparison, the MMR in the United States is 8 per 100,000 live births.

In Guatemala, TBAs attend approximately 70% of all births, with this percentage rising to over 90% in certain areas of the rural highlands, where the greatest mortality and morbidity occurs. Given that the current and foreseeable institutional capacity of the MOH to attend births is 20%, the TBA is must logically be recognized as the key element in any program/strategy to reduce the maternal and infant mortality rate in Guatemala.

Past TBA program efforts have been largely unsuccessful and generally based on western institutional-based models that have little relevance to the situation in Guatemala. A new approach is required. The proposed INCAP Quetzaltenango Maternal and Neonatal Health Project is an innovative program that provides a "Guatemalan solution" to priority maternal and neonatal health problems, using local resources and existing health area staff.

The project is based on diagnostic studies performed by INCAP which:

1. Have identified the principal health events that result in the highest maternal, intrapartum, and neonatal mortality.
2. Have documented the present practices and deficiencies in the management of high risk pregnancies, births, and newborns by TBAs and the health system which is responsible for receiving their patients.

The program is unique in that it focuses not only on improving the midwife's knowledge, skills and relationship to the formal health care delivery system, but also on the system's capacity to respond appropriately and effectively in managing high risk maternal and neonatal cases which are referred.

The project includes a strong baseline and evaluation component in order to ensure that the program's interventions/activities on reducing maternal and neonatal mortality and morbidity can be measured. The project model is designed to be sustainable, easily adapted and replicable on a national scale and is an appropriate model not only for Guatemala, but for other countries in the region and possibly, other areas of the world.

The project activities/interventions will focus on:

1. Baseline data collection and monitoring of program impact.
2. Improving communication and the relationships between the hospital, health centers and health posts.
3. The development and establishment of norms to improve the detection, referral and management of high risk maternal and neonatal cases at the health post, health center and hospital level.
4. Increasing the TBAs knowledge level and appropriate detection, referral and management of high risk obstetric and neonatal cases and providing them with the necessary equipment/tools to carry out this new approach.
5. Improving the relationship between the community, the TBAs and the health care delivery system.

I. BACKGROUND

A. RELEVANT STATISTICS

Despite the fact that maternal deaths, and intrapartum, neonatal and early post-neonatal mortality represent the major categories of deaths in infants and women of fertile age in the region, these areas have received little programatic attention compared to other health problems such as diarrhea and vaccine-preventable diseases. Recently, international health organizations including WHO, PAHO and AID have assigned a greater priority to this critical period through the "Safe Motherhood Initiative."

Guatemala occupies one of the worst positions in the hemisphere in regards to health indicators. According to the 1987 DHS, the estimated infant mortality rate is 73.4 per 1000 live births, with rates reaching as high as 119.3 per 1000 live births in the highlands. At least 1% of all infant deaths occur within the first 28 days of life (Bossert and Del Cid, 1987), however recent studies have shown that percentage to be as high as 46% (Bartlett, 1989 and Andrade, 1988). If the definition of infant mortality is expanded to include perinatal mortality (death from 28 weeks gestation to age 7 days), then close to 50% of all infant mortality in Guatemala occurs before the age of one month.

National data on the leading causes of neonatal mortality are not available, however, studies conducted in Santa Maria Cauque, as well as the current investigation by Dr. Al Bartlett of INCAP show the principal causes of death to be: intrapartum asphyxia, birth trauma, prematurity, pneumonia and neonatal sepsis. Dr. Bartlett's study cites extremely high risks of intrapartum and neonatal death are associated with: prematurity, rupture of the membranes > 24 hours before delivery, malpresentation and hemorrhage.

The underlying and often direct causes of neonatal deaths are related to:

1. The health and nutritional status of the woman during pregnancy.
2. The quality of care during pregnancy and delivery.
3. The care of the newborn infant.

No systematic studies of maternal mortality, with data collected from both the community and hospital setting, have been conducted in Guatemala. Estimates range from 100 to 144 per 100,000 live births (MOH) to 1000 to 1700 per 100,000 live births (World Bank). While the World Bank figure is probably inflated, due to the fact that only 20% of births occur in the hospital and that little incentive exists to report the death of a mother who dies of a pregnancy related complication in the community, considerable under reporting undoubtedly exists. A recent INCAP survey of MOH hospitals nationwide shows a maternal mortality rate of

approximately 220 per 100,000 live births. (As a basis for comparison, the MMR in the United States is 8 per 100,000 live births).

The principal causes of maternal death according to the MOH and the recent INCAP study are: sepsis, hemorrhage, eclampsia, and abortion. Three of the five leading causes of all hospital discharges in Guatemala are pregnancy related (normal birth 24%, direct obstetrical causes 8% and abortion 5%) (Bossert and Del Cid, 1987), indicating the tremendous importance of pregnancy related activities to the formal health care system.

The factors related to maternal deaths are:

1. The accessibility of health services (socio-cultural, economic and geographic).
2. The availability and quality of the resources and services.
3. The regionalization of health services using a "high risk approach", with an appropriate referral system.

B. THE ROLE OF THE TBA IN GUATEMALA

Traditionally, the midwife has been accorded high status within her community, particularly among the Mayan population. There are an estimated 20,000 TBAs in Guatemala and TBAs attend approximately 60% to 70% of all births, with this percentage rising to over 90% in certain areas of the rural highlands. TBAs also provide the majority of prenatal care.

Despite the fact that the TBA is the major provider of health care for women in Guatemala and has the greatest potential to impact on perinatal and neonatal mortality, she receives little recognition or support for her contribution to the health care system and rarely has an established working relationship with the health care professionals in her area. TBA programs are not given priority, nor significant resources or support within the MOH.

The GOG, with the assistance of international donors such as UNICEF, has been training TBAs since 1955. As of 1987, the MOH had trained 13,908 TBAs. Despite 30 years of training experience and the extent of services provided by TBAs in Guatemala, no systematic/valid investigation/evaluation of the effectiveness of TBA training on reducing maternal and infant mortality has been conducted.

An analysis of TBA training and practice in Guatemala, conducted by FRITECH in 1989, concluded that, in general:

1. The training has been based on a western, ethnocentric, urban, hospital-based model, which is not only inappropriate for childbirth in the community, but potentially increasing maternal and neonatal mortality and morbidity.

2. The pivot around which any effective midwife program revolves is the identification, referral and proper institutional management of high risk pregnancies. The past training approach appears to have had little or no effect on resolving the significant cultural, geographic, linguistic, economic and emotional barriers to referrals between the community and the health care delivery system.

C. PRELIMINARY FINDINGS OF THE INCAP OPERATIONAL STUDY

In 1988, INCAP began an operations research project in Quetzaltenango to determine how high risk obstetric and neonatal cases were being detected and managed at three levels: the community (mothers and fathers), the TBAs (trained and untrained) and the formal health care delivery system (hospital, health center and health post).

The two basic questions being investigated at all three levels were:

1. What is the existing knowledge level regarding high risk situations/cases and how are they managed?
2. What resources exist for the detection and appropriate management of high risk situations/cases?

The survey has been completed and the data are currently in the process of analysis. The preliminary findings are discussed below in the form of problems identified overall and at each level.

OVERALL

1. High risk cases/events are not being referred appropriately to the next level of referral.
2. Maternal and neonatal morbidity and mortality is significantly under reported.
3. Almost half of all mortality before age 5 years is intrapartum/neonatal (46%).

THE TBA

1. Few TBAs understand and systematically apply the concept of "risk" detection and management, in relation to events such as malpresentation (breech/transverse lie), retained placenta or hemorrhage. In most cases, TBAs know that certain situations are "dangerous", however in general, they do not know the appropriate ways to prevent and manage these events so as to increase the probability of a positive outcome. The concepts of "luck" or "the divine will of God" or "evil eye damnation" are often cited as the reason for a certain outcome.
2. High risk cases are often not recognized, detected and referred.
3. TBAs usually see the primary object of prenatal care to be "reassuring the mother that things are going well", not as an opportunity to "screen for high risk events/conditions". (This does NOT mean to imply that reassurance of the mother should not be an important/appropriate part of any prenatal intervention/visit)
4. The majority of TBAs do not know why a woman should be vaccinated against tetanus.
5. In regard to their relationship to the health care delivery system, the TBAs do not consider the health services as a support system for either them or their clients. Few positive comments were expressed regarding their treatment by health personnel. Commentaries about bad treatment and scolding were common.
6. Many trained TBAs do not consult or report to the health services, with the relationship of untrained TBAs to the health system being essentially non-existent.
7. TBAs are not supervised by health personnel on any type of regular basis and almost never at their home or while attending a delivery.
8. Many TBAs speak little Spanish and few health professionals speak the Indian dialects, resulting in a significant language barrier (during training translators are rarely used).
9. Intramuscular injections of oxytocin are widely used to "give force to the labor". This practice results in significantly higher mortality (Bartlett, 1989). Other harmful practices include: vaginal exams, early pushing, manipulation during labor, ingestion of alcohol, lack of hygiene, prelacteal feeding, improper cord cutting and care and improper care of the newborn immediately postpartum.
10. TBAs are anxious to talk about their experiences and problems, however, they rarely talk to the health personnel in their areas due to fear of criticism.

11. A conflict exists in regard to TBA referral of patients due to: loss of status (referral is seen as a "failure"), loss of delivery fee, bad treatment at hospital/health center and a lack of confidence that the health care system will manage the complication appropriately if referred. Referrals are often made too late for a positive outcome, which increases the lack of confidence in the system.

THE COMMUNITY

1. The majority of mothers and fathers "know" about high risk situations such as breech/transverse presentation, hemorrhage and retained placenta and associate them with the possibility of death for the mother and/or infant. When asked where help should be sought when these conditions occur, the majority of parents stated the hospital/physician, followed by the TBA. The reason most frequently given was that doctors had more "knowledge, medicine and equipment (aparatos)". However, the community often is reluctant to accept referral when it is made.
2. The community often expects the TBAs to handle high risk problems at home. Reasons cited for reluctance to accept referral to the health center/hospital were: "they would die there", they would be operated on or sterilized, language barrier, bad treatment, long waiting times, economic considerations, lack of transportation and fathers not wanting male doctors to examine their partners (jealousy).
3. When asked what could be changed to make referral more acceptable, parents replied that health personnel should: "explain more what they are doing", be more friendly, speak their language, give them more medicine and not make them wait so long for attention.
4. Half of the parents interviewed knew about the use of oxytocin in labor by comadronas and what it was for. Of these, 25% acknowledged receiving oxytocin injections during their last delivery.

HEALTH SERVICE DELIVERY SYSTEM

1. The high risk screening/management approach is not being used at any level of the health system (hospital, health center, health post).
2. No institutional norms for high risk management of cases exists at the hospital level. At the level of the health center/health post, personnel are often unaware that MOH norms for high risk screening/case management exist.
3. Health personnel at all levels have not received training in the high risk approach to maternal and infant care. The "newborn" stage, which statistically is

the most critical in terms of greatest mortality for the infant, is not recognized or treated as a special time, requiring special monitoring or interventions.

4. In the evaluation of the efficiency of health services in the MCH program, the level found was 50%, below what would generally be considered adequate. The health centers/health posts often do not have even the most basic equipment required for screening (ie; functioning BP cuff, stethoscope).
5. A functioning referral and counter-referral system between the health posts, health centers and hospital does not exist. The evaluation found that in general, information on cases registered is poor and inadequate for appropriate management of high risk conditions. The data that is collected is not used to plan, manage or analyse problems.
6. Health personnel as a whole, have little knowledge about TBAs and how they practice/function in the community. Attitudes toward the comadronas are generally negative and traditional practices are often viewed as "dangerous", even when they are not (ie; cord cauterization).
7. The TBA "trainers" (nurses) have received no additional training in high risk obstetric and neonatal case screening and management, nor in appropriate educational methodologies. Educational materials used in the training courses appear to be both insufficient and inappropriate. The nurses expressed their preoccupation with the ineffectiveness of the TBA training courses and the lack of adequate supervision for TBAs.

OVERALL STRENGTHS IDENTIFIED

1. The community acknowledges the hospital to be the appropriate source of referral in high risk situations.
2. TBAs want to have a working relationship with the health care delivery system and receive "support" from health personnel in their areas.
3. TBAs and health professionals at all levels of the system expressed a strong desire for further training and more "knowledge." There is support and acknowledgement for the need to improve and change the system from the "top-down and bottom-up." The common goal identified is to improve the survival rate for mothers and infants. Little (if any) opposition exists to programs to improve the current health care delivery system in regard to the management of maternal/infant health problems.

**KEY MCH STATISTICS:
GUATEMALA AND QUETZALTENANGO/SUR OCCIDENTE**

	<i>Guatemala</i>	<i>Sur Occidente/Quetzaltenango</i>
Population	8.2 million	500,000 total 150,000 city of Xela
Growth Rate	3.2%	3.5%
Urban	33%	33%
Indigenous Population	40%	70% (estimated)
Total Fertility Rate	5.6	6.3
Crude Fertility Rate	4.1	NA
Expected Births/Year	336,200	18,348
Maternal Mortality Rate	9	26
Infant Mortality Rate*	73.4/1000	72.3/1000
Womens' Education		
No Education	38.4%	45.9%
Incomplete Primary	34.8%	33.9%
Total	73.2%	79.8%
Prenatal Care		
None	27.1%	28.5%
MD/Nurse	34.2%	23.2%
Comadrona/TBA	38.2%	47.7%
Other	.5%	.5%
Tetanus Toxoid	13.7%	6.7%
Attention at Birth		
None	3.0%	2.8%
MD/Nurse	29.2%	19.0%
Comadrona/TBA	59.9%	69.7%
Other/Parents	7.8%	9.5%

*Highest in women <20 years or >40 years, primagravidas and >7 children, <2 year birth interval.

*Source: DHS 1987 and 1986 MOH Quetzaltenango Statistics.

QUEZALTENANGO STATISTICS

Hospital General de Occidente San Juan de Dios

	1987	1988	1989
Live Births	2518	2850	2796
Stillbirths	127	142	133
Neonatal Deaths	77	100	127
Maternal Deaths	11	7	6
Births (normal)	2117	2437	2375
Births (operative & forceps)	528	555	565

*a total of 9 of the maternal deaths in 1987, 1988 & 1989 were due to complications from abortion.

Source: Department of Statistics, San Juan de Dios Hospital, Quetzaltenango.

D. DEFINITION AND APPLICATION OF THE "RISK APPROACH" TO SCREENING AND MANAGEMENT OF MATERNAL/INFANT HEALTH PROBLEMS

The concept of risk, which can be expressed in certain quantitative measures for managerial purposes, (such as relative risk and predictive value), is in fact, a kind of shorthand expression of probable future need for care. For example, a pregnant woman with high blood pressure may be at a very high risk for a complicated labor/poor outcome. Therefore the measured risk to herself and her infant is a manifestation of her need for health services (ie; preventative/curative care).

The "risk strategy", which starts with "signals" of the mother's need for assistance, uses these signals as guides for appropriate action in resource allocation/re-allocation in order to improve coverage of care, referrals and ultimately, the outcome.

The determination of risk is an essential component in the formation of health policies and in the determination of priorities and allocation of resources. By quantifying the risk to the health of a population and their associated factors, attention is focused on the necessity for preventative services.

In order for this information to be used effectively the following are required:

1. Predictions regarding the level of care required by individuals at varying levels of risk.
2. The provision of anticipatory care and allocation of resources to individuals and groups at different levels of risk, in proportion to that risk.
3. An increased general knowledge base regarding risk and risk factors, in order for the "risk approach" to be more widely accepted and used.

The WHO/PAHO approach has focused on "high risk" pregnancy detection and referral, determined by a long list of categories, for example: primagravida (1st birth), grand multigravida (>4-5 births), age of the mother (<18 or >35). Little attention has been focused on the actual management of these cases or the quality of the health system that receives them, once they are referred. While these categories are of value in certain regions of the world, where the health care delivery system has the resources and capacity to absorb and treat a greater percentage of the population, in a country such as Guatemala, the application of these categories is not only inappropriate, but can lead to disaster.

As noted previously, at the present time and for the foreseeable future, the GOG's stated capacity for institutional births is 20% of the population. Applying the WHO "risk category" of referring all primagravidas to the hospital for birth ALONE, would far exceed the current capacity of the health care system. This would result in scarce resources being diverted to a proportion of the population who are, in comparison to other categories (ie; transverse

presentation), not at great risk or in need of special attention. In addition, because the vast majority of primagravidas deliver without complication, given the community/TBA barriers to referral, by insisting that all primagravidas be referred for institutional delivery, the health personnel/system risks an even greater loss of credibility and effectiveness.

The risk approach proposed in this project is radically different from the WHO/PAHO model and is based on the detection and management of actual high risk "events" which through operations research, have been prioritized according to the greatest risk of intrapartum and neonatal mortality, based on the existing conditions/situation/resources in which they are taking place.

E. JUSTIFICATION FOR PROJECT, SUSTAINABILITY AND REPLICABILITY ISSUES

The GOG has recently stated that two of its top four priorities in health are to reduce the high maternal and infant mortality rates. TBAs currently deliver approximately 70% of all infants in Guatemala (over 90% in some highland areas-where the highest mortality occurs). This percentage of non-institutional delivery could not be decreased without an enormous increase in expenditure by the health care delivery system. Therefore, any program/strategy to reduce maternal and infant mortality rates in Guatemala must logically recognize the TBA as the key element.

Given the ineffectiveness of past program training efforts (see 1989 PRITECH report, "The Training and Practice of TBAs in Guatemala"), a new approach is required. The focus of program activities should be, not only on improving the midwife's knowledge, skills and relationship to the formal health care system, but also on the system's capacity to respond appropriately and effectively in managing the high risk cases that are referred.

The proposed project will:

- Be the first systematic attempt in Guatemala to develop, implement and evaluate the impact of a TBA training program, which involves the community and all levels of the health care system, using baseline data.
- Use an innovative model, based on an assessment of priority problems of an area, which develops and utilizes appropriate and realistic technologies/solutions to these priority problems, taking into consideration "the capabilities of the system to manage complications."
- Test a new approach to TBA training and supervision.
- Develop a "Guatemalan" approach to high risk pregnancy detection, referral and management, appropriate for the country's resources and current situation, as opposed to an abstract "western" model, requiring extensive resources and based on theoretical high risk categories. A new standard of care will be created and established.

- Establish a new relationship between all levels of the health care delivery system and the community, using the TBA as the link.
- Be a model which is culturally appropriate and combines the best of aleopathic (western) medicine and traditional practices, thereby developing mutual respect between practitioners from both systems.
- Decrease the frustration level and improve moral among the health system staff by giving them simple, concrete tools to improve the health status/relationships of persons in their area.
- Increase the assessment skills and problem solving abilities of the medical and nursing staff by teaching them a more effective way to approach and manage high risk situations in the hospital and community.
- Improve the standard of care for high risk cases by establishing a system where "everyone is talking the same language". Simple and appropriate tools will be given to medical and nursing staff to guide them in high risk situations. This is especially critical given the current staff shortages and the fact that medical students (with little experience and supervision) manage most of the cases.
- Develop a replicable model for maternal and neonatal care, including: norms, information/referral forms and training materials which can be used throughout Guatemala and adapted and used in other countries in the region and possibly, other areas of the world. By testing the intervention phase now, the project can be scaled up to a national level with relative ease.
- Be sustainable because it involves the active participation of the health area staff and TBAs in every step of the process, utilizing available resources and improving the efficiency/effectiveness of the current system. Once developed and tested, the model requires few outside resources.
- Strengthen and accelerate the current process of "decentralization" within the MOH by demonstrating that an independent and innovative program can be designed and carried out by a health district. Communication mechanisms and the relationship between the central MOH, the health district of Quetzaltenango and INCAP will be strengthened by the sharing of new technologies and approaches to critical health problems. (The Xela district health personnel plans to present the project to Dr. Nunez in the MCH Division of the MOH and keep him informed on an on-going basis).

II. PROJECT GOAL, OBJECTIVES, ACTIVITIES/INTERVENTIONS

The overall long term goal of the project is to improve the detection, management and outcomes of high risk obstetric and neonatal cases, thereby reducing the maternal and neonatal mortality rates in 4 districts of Quetzaltenango.

Each of the objectives outlined below is followed by planned activities, rationale/strategy and expected outcomes.

Objective # 1

Establish a baseline set of maternal and neonatal health indicators developed from a survey of key data collected from within the community, health center/health post and hospital from which to evaluate/measure the impact of project activities/interventions on improving maternal/neonatal health outcomes.

Activity

1. Collect baseline data on maternal and neonatal mortality and morbidity from the local hospital, and four district health center/health posts and communities prior to program interventions.
2. Analyze data.
3. Develop indicators.
4. Post program intervention phase, collect data from local hospital and the four district health center/health posts and communities.
5. Analyze data.
6. Evaluate impact of interventions.
7. Revise project design, as necessary based on evaluation. Plan Phase II of project.

Rationale/Strategy

To develop a base of objective data which can be used to evaluate the impact of program interventions on improving the detection, management and outcomes of high risk obstetric and neonatal cases in the community (TBAs), health post/health center and hospital levels.

There is a serious lack of baseline data available at all levels of the system at the present time. The current health information system is totally inadequate from which to base program interventions or in monitoring program impact. Serious under reporting of both maternal and neonatal mortality and morbidity exists at all levels of the system (including the hospital). The collection of baseline data is necessary to compensate for this and to obtain an accurate overview of the priority maternal and neonatal mortality and morbidity problems in the area of Quetzaltenango.

Outcome

The district and central level MOH, INCAP and USAID/Guatemala will acquire reliable and useful information regarding maternal and neonatal mortality and morbidity in the Quetzaltenango area. The impact of program interventions on reducing the maternal and neonatal mortality rates will be available. This information can then be used in future program planning, expansion and replication throughout Guatemala and the region.

*See section of report entitled "Operations Research Methodology" for a more detailed explanation of methodology.

Objective # 2

Improve communication and the relationship between the hospital, health centers and health posts.

Activity

1. Arrange 5 meetings (approx. 10 persons each) between staff at the hospital, health centers and health posts. During the meetings:
 - Distribute and discuss INCAP investigation findings.
 - Orient staff to project and involve them in planning.
 - Establish a system of high risk case review (once a month or every 2 months) between the hospital, health center/health post staff.

Rationale/Strategy

Communication between the levels of the health system is essentially non-existent. It is necessary to establish mechanisms for regular communication and to improve the relationship between the various levels in order for a high risk screening and referral system to function effectively.

Outcome

Regular meetings for a common purpose will lead to: increased understanding of the problems faced by the staff at each level of the system, improved relationships and communication, and improved referral/counter referral and management of high risk maternal and neonatal cases. Regular high risk case review will also increase the sustainability of the new system/approach.

Objective # 3

Establish the consistent and systematic use of norms for the detection, referral and management of high risk maternal and neonatal cases at the health center/health post levels in four districts of Quetzaltenango.

Activity

1. Develop norms based on the INCAP investigation.
 - print and distribute norms
2. Develop obstetric/perinatal history and referral forms for use at the health Centers/health posts in the four districts.
 - test forms
 - print forms
3. Develop curriculum for training of four district health teams in the use of norms and forms.
 - define knowledge areas
 - develop manuals/materials
 - print manuals/materials
4. Train 5 trainers (health staff) to train district health teams in the use of norms and forms.
5. Train the four district health teams in the use of norms and forms.
 - 4 courses
 - 60 health staff

Rationale/Strategy

No standard of care for high risk maternal and neonatal cases currently exists. Norms are not being used and the INCAP investigation revealed a low knowledge level among the health staff regarding the detection and management of these cases/problems. By establishing clear norms (guidelines) and a simple, easy to use, system of forms, for use in history taking, screening, referral/counter referral and management of maternal and neonatal priority problems, and by training a cadre of health staff to train other staff in their use, a new standard of care will be established and sustained.

Outcome

The knowledge base of health center/health post staff in the detection, referral and management of high risk cases will be increased. An improved standard of care for these priority problems will be established, along with improved outcomes. An improved data collection and referral system will also increase/improve communication between the health center/health post and hospital levels and facilitate/improve supervision of health staff.

Objective # 4

Establish an improved standard of care in the management of high risk maternal and neonatal cases at the hospital level through the use of norms and forms.

Activity

1. Develop norms.
 - analyze hospital information/data/current practice/resources
 - develop high risk and normal classifications
 - revise existing norms/guidelines
 - print new norms
2. Adapt CLAP perinatal history form
 - test form
 - print form

3. Train hospital staff (nurses & MDs) in use of norms and forms.
 - identify and designate appropriate permanent staff to take on on-going responsibility for supervising and training new staff in use of norms and forms
4. Supervise the use of norms and forms in collaboration with designated staff.
5. Evaluate norms and forms after 6 months of use.
6. Train hospital management to use data collected to improve on-going management of cases/hospital system of care.

Rationale/Strategy

The INCAP investigation determined that at the area hospital which receives high risk referrals, the knowledge level and standard of care in the detection and management of high risk maternal and neonatal cases was inadequate. The hospital system relies heavily on inexperienced medical students who are poorly supervised. In addition, there is a shortage of nurses. No consistent guidelines for care are followed currently and the treatment of patients with similar conditions varies widely, depending on the medical resident rotating through the ward at the time. The use of an improved history and physical exam form will increase the detection of high risk problems and focus attention on their special management. The use of norms/guidelines for care will standardize and improve the quality of care and provide appropriate guidelines for high risk case management to inexperienced health staff. The new forms will generate data which will be useful for planning, supervision and resource allocation within the hospital system.

Outcome

The normatization of hospital obstetric and neonatal care will result in: increased knowledge base of the hospital staff and improved detection, management and outcomes for high risk maternal and neonatal cases; increased efficiency of the hospital units; improved relationships/communication between hospital staff (everyone will be "talking the same language"); improved medical education and supervision of medical students; improved and more efficient supervision of nursing staff and a more effective approach to problem solving/resource allocation within the hospital system.

Objective # 5

Increase TBAs knowledge level and appropriate detection, referral and management of high risk obstetric maternal and neonatal problems and provide them with the equipment necessary to do so (ie; fetascopes). Establish an on-going, working relationship, based on mutual respect,

between the TBAs and the formal health care delivery system in 4 districts of Quetzaltenango.

Activity

1. Design referral forms (using pictorial depiction of high risk situations) for use by TBAs when referring mothers/infants to the health center/health post/hospital.
 - test forms
 - print forms
2. Develop innovative curriculum and training materials for use in TBA training, in-service and supervision.
 - print manuals/materials
 - compile/organize/purchase local materials for on-going use in training
3. Train 4 trainers (health center nurses) to train TBAs.
4. Train TBAs in four districts.
 - 100 per district approximately, total = 400
 - 3 days initial training, followed by 1 day per month for 9 months
5. Supervise TBAs.
 - monthly meetings at health center/health posts
 - develop and print form for the nurses to record all TBA related contacts/statistics (ie; # of births attended, referrals to health center/health post/hospital, deaths/complications, visits to health centers & attendance at meetings)

Rationale/Strategy

The key to decreasing the maternal and neonatal mortality and morbidity rates depends largely upon TBAs' detection and appropriate referral and management of high risk conditions in pregnancy, intrapartum and postpartum. The effectiveness of the TBAs will depend upon: increasing the TBAs' ability to detect and manage high risk situations appropriately; developing a simple tool for referral to the health post/health center/hospital (referral card)-this will also act as a feedback mechanism for the TBA; improving the relationship between the TBA and the health care system so that referrals are made willingly by the TBAs and accepted by the

community (mutual respect and understanding will be emphasized during the training and supervision sessions) and in developing and establishing an improved training approach on the part of the TBA trainers and supervisors.

Outcome

The TBA training activities will result in: an increased knowledge base and improved detection, referral, management and outcomes for maternal and neonatal high risk situations by the TBA; a new and improved mechanism for referral and feedback between the TBA and health system (better communication); an improved working relationship between the TBA and the health system; an improved relationship between the community and the health care system; increased mutual understanding and respect for problems encountered by both the TBAs and the nurses/health staff; and increased skills on the part of the health center/health post nurses in training and supervision of TBAs and other health workers in the community.

Objective # 6

Project activities and interventions will be monitored closely on an on-going basis throughout the life of the project.

Activity

1. Monitoring visits by INCAP project staff to hospital, health center/health posts and TBAs in four districts at least 1 x per month.
2. Case review of all maternal and neonatal deaths in the hospital, health center/health post and community in four districts will be conducted by INCAP project staff in collaboration with health staff at all levels of the system.

Rationale/Strategy

Project activities and interventions need to be monitored on an on-going basis in order to: regularly determine whether project objectives are being met, what changes in project activities/approach need to be considered and maintain morale at a high level among staff in the project by observing positive project impacts (feedback mechanisms).

Outcome

Monitoring project inputs/outputs on an on-going basis will ensure that the project maintains and meets its objectives and allow for appropriate changes to be made, based on valid observations/feedback mechanisms.

III. OPERATIONS RESEARCH

This project will measure program effects in two ways: impact measures and process measures.

IMPACT MEASURES

The quality of existing data in the health system on maternal and neonatal mortality and morbidity has been documented by INCAP to be of such poor quality that it would be totally inadequate for evaluation of program impact. In addition, one of the objects of the intervention is to dramatically increase the reporting of maternal and neonatal mortality in the Quetzaltenango health system. Success in this will result in an "apparent increase" in maternal and neonatal mortality due to better reporting, even though in real terms it may be reduced.

For these reasons, survey methodology will be used to develop information on maternal/intrapartum and neonatal deaths in population subsets of districts in which the intervention is being executed, as well as in comparable subsets of non-intervention districts.

Since the overall strategy of the project is to focus primarily on the reduction of mortality associated with high risk obstetric and neonatal events, mortality, rather than morbidity will be the impact indicator.

Due to sample size limitations, maternal mortality cannot be used as an impact indicator in this study; however, it will be measured. In respect to intrapartum and neonatal mortality, despite the fact that the rates are "high", over the course of a reasonable period of time available for baseline data collection, these are relatively "infrequent" events. Therefore, the sample sizes needed to statistically document important reductions in intrapartum and neonatal mortality (ie; 25% reduction) are so large (2000 births per group, estimated 10,000 families interviewed required), that to carry out such a survey would be beyond the resources and/or scope of this project.

To document trends in intrapartum and neonatal (and maternal) mortality rates, surveys will be conducted in two of the four health districts participating in the intervention, and in two control districts. One control district will be selected from those not participating in intervention activities, but belonging to the same health area (Quetzaltenango) and one will be selected from the demographically similar adjacent health area of Totonicapan.

A base population of 12,000 persons in the two intervention districts and 12,000 in the two control districts will be surveyed, giving an estimated total of 600 births in each area, distributed in randomly selected, logistically accessible sectors, which will be sub-classified as "concentrated" or "dispersed" populations. Comparable population profiles will be generated in the sample selection process in each district through stratified randomization using these categories.

This survey will be performed in the initial three months of the intervention activities, and again at the close of the project. This survey will include visits to all households in selected sectors in each district, in order to identify households with births in the preceeding 12 months. Maternal, intrapartum and neonatal mortality associated with these births will be identified, applying

standardized definitions. Limited information on services used for prenatal, birth and postnatal care will also be collected in a highly focused interview.

PROCESS INDICATORS

The process indicators measured will be:

The Health Service Delivery System

1. The number of high risk case reviews conducted by the hospital, health centers and health posts as a team. If the system of case review is established after the norms and forms are in place (time frame 10 months), and reviews are conducted every 2 months, then a number of 7 or greater would be considered positive.
2. The existence and use of norms & forms at the health posts and health centers in the 4 intervention districts and in the hospital. This will be verified at 14 months (3 months after the time frame established for implementing norms & forms) and at 20 months (6 months after 1st verification) in the project, by the INCAP team in collaboration with designated health staff.
3. A significant increase in the base knowledge level of health personnel regarding the detection and management of high risk maternal and neonatal health problems (25%). Pretests of health personnel at all three levels have already been conducted as part of the initial phase of this project. Post-tests will be conducted at 1 year and at month 22 of the project.
4. Referral outcomes will be analyzed by the INCAP team, in collaboration with designated health staff on a bi-monthly basis. Referral source (ie; TBA, health center), appropriate timing of referral (ie; too late for positive outcome), and norms followed will also be assessed.

The TBA and Community Level

1. The number of cases referred by TBAs, attendance at training sessions, attendance at monthly meetings, and visits to the health post/health center in the TBA's area will be measured. A baseline of this data will be carried out in the 4 project districts for 2-3 months at the beginning of the project, prior to any interventions. An increase of 25% will be considered positive.
2. The use of the carnet (referral form/client prenatal sheet) and birth registration form by the TBAs will be measured 3 months after each initial 3 day TBA training session (at 18th month of project) and then again at 5 months post 3 day session (23rd month of project).

3. The percentage of births in the community in which oxytocin is used will be measured. Mothers and fathers in the intervention districts will be surveyed at 3 months post initial 3 day TBA training session (at 18th month of project) and again at 5 months post 3 day session (23rd month of project).

The measurement of outcomes (intrapartum and neonatal mortality), linked to the measurement of process indicators will be adequate to document the impact of this trial intervention phase, and provide valid information for program evaluation, planning and replication.

A P P E N D I C E S

APPENDIX I

BUDGET

Personnel

Field Personnel

3 months per 20 persons x 755 Q each = 45,300 Q = 13,500 \$US

Field Supervisors

3 months per 2 persons x 1500 Q each = 9000 Q = 2700\$ US

Times 2 survey rounds (baseline and evaluation) = 16,200 x 2 = 32,400 \$US total

Field Director

3 months per 1 person x 975 per month = 2925\$ US x 2 rounds is \$6000 US

Total personnel costs \$ 38,500 US

Per Diems

11 Q per day x 22 persons x 60 days = 14,520 Q = 4,300 \$ x 2 rounds = 8,600 \$US

Transportation Costs

\$60 per day x 60 days x 2 cars = \$7200 x 2 rounds = \$14,500 US

Data Management

\$2000 US

Survey Supplies

\$1000 US

Total Survey Cost: \$64,000 US

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APPENDIX II

TECHNICAL ASSISTANCE REQUIREMENTS

**All consultants must speak Spanish at Level III or above, with the possible exception of the physician/lecturer in #1.*

1. Development of Norms and Forms in Hospital and Health Posts

Job Description

1. Well-known obstetrician/perinatologist/public health physician with experience in high risk management of obstetric and neonatal cases using a combined bio-medical, anthropological and culturally appropriate approach.

Consultant will lecture/work with hospital chiefs, the Jefatura de Area and other physicians to educate/convince them regarding the scientific merit/improved outcomes of the proposed "new approach" to managing high risk maternal and neonatal cases.

Estimated time needed: 2 weeks

2. Nurse-Educator with experience in high risk screening and referral in rural areas, using TBAs, in developing countries.

Consultant will work with the nursing staff at the hospital, health centers and health posts in the 4 intervention districts to educate them regarding the "merits" of the norms, forms and new approach.

Estimated time needed: 1 week

2. Carnet and Client Information Sheet for Use by TBAs

Job Description

Health professional with extensive experience in working with primary health care workers/TBAs in developing countries with little or no formal education in the development of appropriate referral tools.

Consultant will assist the INCAP investigators in the development of an appropriate referral/information form for use by the TBAs in working with the health posts/health centers/hospital.

Estimated time needed: 1 week

3. Develop Training Manual and Materials for TBAs

Job Description

Nurse-Midwife with extensive experience in TBA training and materials development in developing countries (preferably Central America).

Consultant will assist the INCAP investigators in the development of: an appropriate and effective TBA training manual for use by the TBA trainers; appropriate and effective training materials/tools; and material/tools for TBAs to keep.

Estimated time needed: 3 weeks

4. Train Trainers of TBAs and Train TBAs

Job Description

Nurse-Midwife with extensive experience in TBA training in developing countries, preferably in Central America.

Consultant will assist the INCAP investigators in the training of trainers and TBAs.

Estimated time needed: 3 weeks

5. Evaluation of Project Impact

Job Description

Public Health professional/s with extensive experience in: clinical MCH care, program implementation and evaluation in developing countries.

Epidemiologist with extensive experience in the evaluation of program impact measures.

Consultant/s will work with the INCAP investigators and designated health staff to design/refine evaluate component of project and evaluate program impact.

Estimated time needed: 1 month

1 week at beginning of baseline intervention phase

10 days into 1st year of project

10 days at end of project

CONTRIBUTIONS TO PROJECT

INCAP

1. \$46,000 US for initial study which led to this project.
2. \$2500 US for office equipment.
3. \$4,800 US for Dr. Schieber's salary for 4 months of project.
4. \$2000 US for computer analysis.
5. \$1000 US for part-time computer graphics person during development of training materials.

*all figures are approximate

HOSPITAL

1. Training time of professional staff to develop, implement and evaluate/supervise the system of norms, forms and high risk management of cases.
2. Time of professional staff in the development and establishment of new system/approach.

HEALTH POST/HEALTH CENTER LEVELS/JEFATURA DE AREA

1. Training time of professional staff in the development, implementation and supervision of new system of norms, forms and high risk screening, referral and management.
2. Professional staff time in training of trainers and training and supervision of TBAs (this constitutes a significant amount of time for the nurses).
3. A percentage of per diems for TBAs during training.

**HIGH RISK OBSTETRIC AND NEONATAL
MANAGEMENT
IN THE RURAL HIGHLANDS OF
GUATEMALA**

INVESTIGATORS

**Barbara Schieber MD, Principal Investigator
Hernan Delgado MD, Co-Principal Investigator
Alfred Bartlett MD, Co-Principal Investigator**

INCAP

JANUARY 1990

I. BACKGROUND

In August, 1988, INCAP began an operational research project regarding the management of high risk obstetric and neonatal cases at the levels of families, Traditional Birth Attendants (TBA's), community health services and Hospital in the health area of Quetzaltenango.

The objectives of this study were to detect the major problems and obstacles at each level of health care, beginning with the community TBA, which affect management of high risk cases. The longer range goals were to assist health personnel in developing and implementing interventions which would resolve these problems and to evaluate the effects and impact of these interventions. In principle, such interventions would be focused on an improved detection and management of high risk obstetric and neonatal cases, and consequently would be expected to have an impact on the high rates of maternal and neonatal deaths in this area.

In February 1989 the outgoing study was evaluated by Dr. Barry Smith and Pamela Putney, USAID consultants with substantial experience in TBA programs. They included in their recommendations that USAID-Guatemala, among its efforts in support of projects to lower the high rates of maternal and early infant deaths in the country, should support the investigator in charge of the diagnostic study in continuing investigation and in developing intervention and evaluation activities. However, the budget and scope of the current study is limited, and it can be foreseen that the intervention phase of the project can not be accomplished in an effective way, nor evaluated, within that small project. These activities outlined here are therefore proposed as a follow-on project, designed to take advantage of the information and experience gained in the diagnostic study.

At this point, the basic diagnostic study has been successfully executed, yielding detailed information which can serve as the basis for a trial intervention. The study has also identified

specific areas in which additional information can be expected to enhance the effectiveness of such an intervention.

Three areas require additional study to complement the information already collected:

1. Identify the causes and factors associated to maternal mortality.
2. Identify the factors associated with maternal acceptance or refusal of TBA's referral of high risk obstetric cases, and the outcome of this acceptance/refusal.
3. Identify the causes and factors associated to perinatal and neonatal mortality.

The project has excellent prospects of successfully establishing an intervention model. Since the beginning of the project the investigator has established excellent working relations with the health personnel at all levels, including TBAs and the chief of the obstetric department of the regional hospital. The chief nurse of the health area of Quetzaltenango has been involved in the whole diagnostic process since the beginning, and the chief of the health area also has expressed his desire that an intervention project be done jointly with the health personnel, since it will respond to a major health problem of the area.

This is a very important aspect, and it permits us to expect that the implementations established will have continuity even when the investigators of INCAP leave the area. It also permits the use of human and physical resources already existing in the area, and will therefore not be an ideal and unreal model that will not be possible to be replicated and reproduced in other areas of Guatemala or the region.

This proposal then covers the execution of the three investigations above mentioned. An additional proposal will address the subsequent development of the intervention and evaluation phases.

A. Maternal and Infant Deaths

Epidemiological research and demographic analysis have shown that there is an association between the health, social status, and level of education of a woman and the risk of her child dying in infancy. Moreover, as reporting of deaths becomes more complete, even in many of the least developed countries, it is becoming increasingly clear that approximately half of all infant deaths occur in the first months of life, and usually in the first weeks. The underlying and often direct causes of these deaths relate to:

1. The health and nutritional status of woman during pregnancy.
2. The quality of care during pregnancy and delivery, and
3. The immediate care of the newborn infant. (2)

Furthermore, the consequences of maternal ill health and poor-quality maternal and infant care are reflected in a high risk of impaired function and disability among the surviving newborn infants (2).

In Guatemala, overall infant mortality is 73.4 per 1,000 live births; however in rural highlands the rate is considerably higher (119.3). Of all infant mortality in Guatemala, 31% is neonatal mortality (3,4).

In the last decade the continental middle America subregion has had the slowest rate of decline of infant mortality, Guatemala persists in having one of the highest rates of infant mortality in the Americas.

Of known causes of infant mortality "perinatal conditions" are the first or second most common in all Central American countries except Nicaragua. As child survival interventions reduce the mortality from other common illnesses affecting young children, perinatal and neonatal mortality become even more prominent.

And it is also noticeable that intrapartum and neonatal (IP/NN) mortality has received less programmatic attention than diarrheal disease, respiratory infections and vaccine preventable diseases and interventions to reduce IP/NN mortality have not been developed or evaluated. Also the figures only indicate that mortality is very high but there is almost no information as to what the specific causes of IP/NN mortality are and the risk factors associated to it.

Maternal deaths, while very rare in industrialized countries, are still a very important problem in most developing countries. In many countries pregnancy-related causes are the most common cause of death among women between 15 and 45 years of age. Reporting is incomplete, but estimates of 2-10 maternal deaths per 1,000 live births are common in many of the least developed countries and studies have occasionally reported rates around 30 per 1,000 live births (5,6).

The maternal death rate is a very good indicator of how well the services of prenatal/partum and post-partum care are functioning.

The World Health Organization (WHO), estimates the average Latin American maternal mortality rate at nearly 300/100,000 (population review). In the countries of the region.

complications from pregnancy, delivery and puerperium are among the principal causes of deaths in women in reproductive age (5). In Guatemala, the Ministry of Health (MOH) reports 144 maternal deaths per 100,000 live births; however, considerable underreporting affects the official figure, since there are no incentives to report the death of a mother who dies in the home from pregnancy related complications. Often the mother dies from obstetric causes, but some other diagnosis is recorded (i.e. cardiac arrest, malnutrition, etc.). The maternal death rate in Guatemalan hospitals is 12.3 per 1,000 live births. (2,5,6).

Women from 15 to 49 years represent approximately 25% of the population in the region; if the fertility and population growth rates combined continue as they are now, more than 1 million maternal deaths are expected between 1980 and year 2000 in the Latin America/Caribbean region (5).

The factors associated with maternal deaths are:

1. The accessibility of health services (socio cultural, economical, geographical)
2. The availability and quality of the resources and services (human, physical, and financial)
3. The regionalization of health services using a high risk approach, which permits an appropriate referral system. (2,4,5)

B. The Role of the TBA in Guatemala

The MOH of Guatemala has stated that its current capacity does not permit it to attend much over 20% of births in the country, and this situation will remain unchanged for the

foreseeable future. Approximately 60-70% of births are attended by TBA'S. This figure varies from region to region, and in the Guatemalan rural highlands it is estimated to be 80%.

Despite the important role that the TBA has in maternal and neonatal health, the TBA programs in Guatemala are not considered very important, and do not have substantial resources and support within the MOH. In Guatemala since around 1950 the MOH has conducted TBA'S training programs. International health organizations including UNICEF, UNFPHA and USAID have substantially supported and funded these programs. However, these efforts have not been evaluated to establish the effectiveness and impact of the programs carried out to date.

In 1988 INCAP started an operational research project in the health area of Quetzaltenango, to establish how the high risk obstetric and neonatal cases were being detected and managed at three levels: community (mothers and fathers), TBA'S (trained and untrained), health posts, and hospital. The basic questions being investigated were: what is known and what is done in relation to high risk cases, and what resources exist to solve these problems?

As of this date, the studies at all three levels have been completed and the data are in the process of analysis.

C. Preliminary Findings of the INCAP TBA Survey

The preliminary findings of the study of TBA's knowledge and practices in relation to high risk obstetric and neonatal cases show that few TBA'S have a concept of risk or danger associated with specific situations such as breech position, placental retention, or hemorrhage. However, their concept of risk is not the same concept as the biomedical or scientific concept

and often does not include the concepts of prevention or management. TBA'S frequently respond to the question of why certain risks events occur by stating that is the luck of the woman, or God's will, or some evil eye damnation. The concept of the "divine will of God" is still very important in relation to action in the presence of high risk situations. The concept that "it will go as God wishes" is still very widely encountered. In some cases TBA'S know that certain risk situations do occur, but do not know what to do in specific situations in order to promote the best possible outcome.

Frequently the TBA'S response to the question of what to do in a particular high risk situation such as threatened abortion, puerperal infections, etc. focuses on use of herbal or traditional treatments such as herbal infusions, massages, binding. The response seldom includes the indicated biomedical/modern treatment of these conditions. Other situations generally conceived of as being high risk are not clearly or adequately defined; for example, the concept of prolonged labor is not clear, with normal duration of labor described as ranging from hours to 3 or 4 days. Frequently the TBA will refer the patient to the hospital only after several days of labor (when the infant would surely be dead).

Some TBA practices themselves create risk. For example a substantial number of TBA'S use oxytocin intramuscular injections "to give strenght" to the mother even when they have been told in the health services not to use them, and when some of them "know" (but probably don't believe) that this injection can be harmful for the mother and the neonate.

For many TBA'S each delivery is seen as an event totally separated and different from all other deliveries they have attended. For example, the experience of a previous breech delivery in which the baby died does not necessarily result in the recognition of another breech delivery as a dangerous situation: the TBA'S argument is that some breech infants die and some

don't, it's a question of bad or good luck. Again, the abstract and statistical concept of risk is often incompletely formed or absent from their direct experience.

Most of the TBA'S don't know why a pregnant woman should receive antitetanus vaccination.

The principal objective of prenatal care, which biomedically is the detection of risk factors, is not seen as such, by TBA's for them this phase seems to be more oriented to reassuring the mother that things are going well. Many TBA's do not give prenatal care. It seems that TBA'S view themselves mostly as only "birth attendants", with the most important part of their work being the delivery itself. When asked about prenatal and postnatal complications TBA'S tend to mention intrapartum events, as if the pregnancy or puerperium by themselves are not very important.

In regard to the relationship between the TBA's and the health services, the TBA'S did not consider the health services as a support system for them, and did not express many positive attitudes about health personnel. Commentaries about bad treatment and scolding received from health personnel (regaños) were frequent.

Many trained TBA's do not consult nor report to the health services, and the untrained TBA'S have almost no relationship with the health services. TBA'S are not supervised on a regular basis, and almost never at their home or while attending a delivery.

Other limitations are the language barrier, since the health personnel usually do not speak Indian dialects; in training and retraining sessions a translator is almost never used.

It was found that the TBA'S do have some very important beneficial practices such as: attending deliveries with the mother in kneeling position, doing external versions for malpresentations, and cauterization of the umbilical cord. Beneficial practices, are not

recognized or considered so by the trainers and the health personnel, and are actively and constantly discouraged during the training and monthly sessions.

There are some neutral and not yet classified practices such as: using the temascal, giving the mother herbs and massages.

Some very important negative practices were found. Injections of oxytocin are very widely used, and available at all pharmacies in the communities, without medical prescription.

Also some TBA'S use surgical gloves and do vaginal examinations without proper sterilization of the gloves.

It was found that many comadronas wanted very much to talk about their problems and experiences, which they almost never do with the health personnel because they are afraid of criticism.

The TBA's actually asked the INCAP investigators for training, especially regarding high risk situations for them the important question was: "How could they know when a delivery could happen at home and when not?".

Since the INCAP field personnel conducting the research were physicians, they repeatedly were asked by TBA's to examine patients, and the relationship established with the TBA'S was very positive and will permit working very closely with the TBA'S in the intervention phase of these studies.

D. Preliminary Results of the Community Survey

The preliminary findings from the community level study regarding what fathers and mothers know about high risk obstetric and neonatal cases show that situations as breech and

transverse presentation, hemorrhage, and placental retention are associated by parents with dying or the possibility of dying. When asked who was the person or institution they thought could help more in these situations, parents most frequently mentioned the hospital and doctor, followed by the TBA.

The reasons mentioned why doctors could help more was because they had more "knowledge", "medicine" and equipment (aparatos). This could prove advantageous to a high risk referral system implementation. Half of the sample interviewed knew about the use and supposed purpose of oxytocin injections by comadronas and approximately 25% acknowledged receiving such injections in a delivery.

The recommendations the interviewed persons gave about what could be done to make people accept referral and go to health services and hospital was that the health personnel should explain more about the benefits of the hospital, should be more friendly, speak their language, give them more medicine, and not make them wait so long for attention.

The reasons mentioned why people wouldn't go to the hospital were that they would die there, would be operated on or sterilized, as well as the language barrier because husbands were jealous of doctors.

Also, respondents mentioned that the health service given was often not very satisfactory (bad treatment, long waiting time, bad food, etc.), as well as mentioning transportation and economic problems associated with going to the hospital.

E. Preliminary Results of the Survey of the Health Service Delivery System

The preliminary findings of the study of the health services show that the high risk approach is not being used at the hospital level nor in the majority of local health services. Also there has been no specific training in high risk approach in maternal and infant care. Some health personnel at the local level do not know that MOH norms of high risk case management exist, and at the hospital level there are no institutional norms.

In the evaluation of conditions of efficiency of health services in the maternal and child health program, the level was about 50%, below what would generally be considered an adequate efficiency level.

A functional referral and counter-referral system for high risk obstetric and neonatal cases does not exist. The findings of the evaluation of the information system reflects that very poor and inadequate information is registered in the clinical histories of pregnancy care.

In the TBA program evaluation it was found that the TBA trainers (the nurses) have not received any additional training in high risk obstetric and neonatal case management, nor in educational methodologies. Educational materials for TBA training courses appear to be insufficient and inappropriate. The nurses in charge of the TBA program expressed their preoccupation about the low effectiveness of the TBA training courses, and about the lack of adequate supervision for TBA'S.

A very great interest in our project was expressed by the nurses, who almost uniformly indicated their willingness to participate in developing and testing changes in the TBA program as a whole. Also, the nurses pointed out their need to improve their knowledge in obstetric and neonatal issues, and in educational methodologies.

It was found that the health personnel as a whole do not have knowledge about TBA and community health practices. Some known traditional practices are viewed as dangerous, even when they are not (i.e. cord cauterization).

F. Recommendations of the On-Going Survey Evaluation

This INCAP investigation was evaluated by Pamela Putney and Dr. Barry Smith, both consultants to USAID-Guatemala, in the process of their evaluation of the training and practices of TBA'S in Guatemala. These consultants made the following observations about needs for investigation in this area (1):

- * The major causes of maternal/infant mortality and morbidity in Guatemala, with an emphasis on the neonatal and perinatal period.
- * The relation of specific components of prenatal care with improved outcomes (what specific prenatal interventions contribute to positive change and why).
- * Improved monitoring of MOH response to TBA referral, redefinition of high risk practices, and the development of high risk case review committees, because the impact of TBA referral in reducing maternal/infant mortality depends on the appropriateness of the treatment of high risk cases by the health care systems.

II. PROPOSED RESEARCH ACTIVITIES

Taking into account the preliminary findings of the INCAP study started in 1988 and the recommendations of the USAID consultants, we believe it is necessary to complement the information already existing with investigation in following areas:

1. A case control study of maternal deaths in the health area of Quetzaltenango with the objective of identifying specific causes of maternal deaths, and determine risk factors associated with those maternal deaths. The importance of obtaining this information is that the specific causes and risk factors associated with maternal deaths have to be included in the training of TBA'S and health personnel of all levels, to improve the detection and management of high risk cases and thus avoid these deaths.

2. An investigation of referrals of high risk cases by TBA'S and the outcome of these referrals. This investigation should identify the factors determining and associated with mothers' and families' acceptance or refusal of TBA'S referrals of high risk obstetric cases. This information will be very important, because it will permit the identification of a specific population that will need more focused attention and education to accept referral when necessary, as well as identify positive reasons emerging from within the culture which allow acceptance of referral. This study will also investigate the outcome of the referrals to determine what kind of cases are referred, when (timely, or too late) and why, as well as how the hospital handles these cases, and problems or obstacles related to their proper management. This information is necessary for the establishment of an adequate referral system.

3. A case control study of perinatal and neonatal deaths in 4 health districts (selected randomly) of Quetzaltenango with the objective of identifying specific causes of perinatal and neonatal deaths, and determine risk factors associated with those maternal deaths. This information is needed to design training contents for TBAs and health personnel and to improve the specific management of these cases at all levels.

A. Objectives

GENERAL

1. Develop information regarding maternal mortality and acceptance of referral of high risk mothers, to provide a bases for an effective intervention in these areas.
2. Develop information regarding specific cause and risk factors associated with perinatal and neonatal deaths.

SPECIFIC

1. Develop accurate diagnosis of maternal mortality at community and hospital during the prenatal, intrapartum and post-partum period, through systematic collection of clinical data regarding maternal characteristics and pregnancy and delivery management.
2. Identify the rates, and potential risk factors associated with maternal mortality in the health area of Quetzaltenango.
3. Identify factors related to acceptance or refusal of midwife-initiated referrals of mothers, and document the outcome of these referrals.

4. Identify the outcome (medical and experiential) of obstetric cases that accept referral initiated by midwives.
5. Develop accurate diagnoses of perinatal and neonatal mortality at the community level by collecting systematic data of clinical aspects, maternal characteristics and events of pregnancies and labor.
6. Evaluate risk factors potentially associated with perinatal and neonatal mortality in 4 health districts of Quetzaltenango.

B. Methodology

GENERAL

During the diagnostic phase of the INCAP study currently under way in Quetzaltenango, the investigator and the field workers had the opportunity to meet and work with midwives from six (60%) of the health districts in Quetzaltenango, establishing a very good relationship with them; this is a very important element for the three studies, since the TBA'S will provide information regarding the substantial number of maternal, perinatal and neonatal deaths which are not registered as such, and will also provide names and locations of the mothers who did not accept referral by the TBA'S. At the hospital level there are already established good relations with the chief of obstetric department, and substantial interest and support for execution of these studies already exists. As in the previous INCAP studies, these proposed study activities will be carried out in close collaboration with local health authorities.

COMPONENT 1

Specific causes and risk factors associated with maternal deaths in pregnancy, partum and post-partum period.

To obtain the number of maternal deaths occurring during 1988, we will use several different sources: 1) TBA'S, 2) civil registers, 3) hospital records, and 4) health personnel from MOH and NGO'S working in the areas. In this manner we will be able to obtain a more accurate number of cases of maternal deaths. In 1987 the health area reported 67 maternal deaths in the whole health area. We suppose that there will be at least 10 or 20 more cases at the local level raising the total of an approximate number of 90 cases. Since the number of cases is relatively small, we will assign to each case two controls, to have greater statistical power in the analysis of these data. Controls will be randomly selected from birth registers in civil records, from which we will select mothers who delivered in the same month as the case but who did not die.

The data will be collected using a standardized form, through personal interviews of the husband, mother, or/and mother-in-law in the home by physicians, who have been working with the project in previous phases.

At the hospital level the source of information will be the clinical history and treating physician of each case or control.

Data on the family, the mother's general health and obstetric history, pregnancy and history of labor, delivery and post-partum will be collected. The data from each specific section of information will include the following:

Socioeconomic: including occupations of father and mother, presence of father in household, education of father and mother, number of persons in household, other indicators of

socioeconomic status (housing type, water source) language spoken, race, type of road that leads to the house, distance from the house to the nearest vehicle in the community, availability of transportation, distance from the house to the nearest health facilities and hospital, presence of older generation (mother's parents or parents-in-law) in the household.

Mothers general health: antecedents of tuberculosis, diabetes, malnutrition, anemia, etc.

General obstetric history of the mother: including age, parity, previous abortions, stillbirths, neonatal and early infant deaths, history of previous pregnancy or delivery complications, known underlying medical conditions, type of prenatal care received in this and previous pregnancies, food supplementation received, tetanus vaccination, family planning.

History of specific pregnancy under study: including estimated duration, complications by estimated month of occurrence; fetal position, multiple fetuses, prenatal care received (provided, when initiated, number of visits), tetanus immunization, weight gained (if known), food supplementation, blood pressure elevation (if known), medications, treatments or manipulations received.

History of labor and delivery: duration of labor (approximately), stage of labor and estimated duration of membrane rupture, fetal position, type of birth attendant (trained, untrained, TBA, hospital, others), examinations, treatments, manipulations during labor, number of vaginal examinations, injections of oxytocin, other medications, maternal fever or illness at onset of labor, degree of hemorrhage; prolapse of umbilical cord; color, odor, meconium staining of amniotic fluid.

History of immediate and later puerperium: hemorrhage, loss of consciousness, vomiting, fever, infections, placental retention, type of treatment, referral.

History of infant condition and care: physical and neurological condition at birth and several minutes after (Apgar. estimate: respiratory effort, color, cry, movement) immediate treatment, evolution of the infant.

COMPONENT 2

Factors associated with maternal acceptance or refusal of TBA'S.referral in high risk obstetric cases and outcome of these referrals.

This study will be conducted both at the hospital and community level. At the hospital level we will identify those mothers that have been referred by TBA'S and accepted the referral. At the community level we will interview TBA'S and ask them which and how many mothers they recommended to go to the hospital for delivery, and which of those did not accept the referral and stayed home.

A standardized instrument will be applied in all cases by physicians working for the project. Data on the family, the mothers general health and obstetric history, pregnancy, history of labor delivery and post-partum, and condition and treatment of the new born, will be collected. At the hospital level, we will identify the satisfaction of the mother regarding specific aspects of care all received; in the community we will identify reasons of the mothers and of the family for accepting or not accepting referral. The attitudinal variables will be measured using scales of measures developed in consultation with medical anthropologist and Health Marketing Specialist.

The interviewers of hospital patients will also document the mothers opinion about the treatment received at hospital, if she understood why she received specific treatments, if treatments or care were explained to her, if she is satisfied with the treatment, what

recommendation she can give which would make the hospital stay easier and more acceptable, why she or her family decided to accept the referral, and if she would go again to the hospital, if referred again in the future (why or why not). This information will be validated by re-interview of a subsample of mothers approximately one month after discharge from the hospital

Mothers at community level who did not accept referral will be identified by monthly meetings with midwives. Each mother will be asked why she or her family decided not to go the hospital, and if she would go in a future occasion if referred again: (why or why not).

The sample size projected to be interviewed is 100 cases of acceptance of referral and 100 cases of refusal of referral.

The interviews will be conducted by physicians, which is important because the interrogator needs clinical experience and knowledge of high risk obstetrics.

COMPONENT 3

Specific causes and risk factors associated with perinatal and neonatal deaths.

This study will be done in the same 4 health districts were the previous INCAP study was done. The first step will be to obtain the total number of perinatal and neonatal deaths that have occurred in the last year in each one of those districts.

This data will be obtained at the civil register of each district. Two subgroups of cases will be formed, one will be still births and the other will be neonatal deaths. A sample of still births and neonatal deaths will be selected randomly in direct proportion of each subgruoup. A total of 30 cases and 30 controls will be obtained at each district which will total 120 cases and 120 controls for the whole study. The controls will be selected randomly within the months

where the case occurred, the data for the controls will be obtained from the birth register cards of the civil register. In the four districts there are 207 perinatal deaths and 158 neonatal deaths in one year (August 1988 - August 1989).

C. Data Collection

The data will be collected using a standardized form, through personal interviews of the mother by trained young physicians who have been working with the project in previous phases.

The interview includes verification of "case" and "control" status and the age of death of each case. The following data will be collected from each case and control:

General characteristics:

Occupation of the husband and the mother, total family size, characteristics of the housing, literacy, maternal age and civil status.

Mothers general health:

Antecedents of tuberculosis, diabetes, malnutrition, anemia etc.

Obstetric history of the mother

Including age, parity, previous abortions, stillbirths, neonatal and early infant deaths, history of previous pregnancy or delivery complications, known underlying medical conditions, type of prenatal care received in this and previous pregnancies, food supplementation received, tetanus vaccination, family planning.

History of the specific pregnancy under study:

Duration, complications by estimated months of occurrence, fetal position, multiple fetuses, prenatal care received (provided, when initiated, number of visits), food supplementation, blood pressure elevation (if known), medications, treatments or manipulations received.

History of labor and delivery:

Duration of labour, stage of labour and estimated duration of membrane rupture, fetal position, type of birth attendant (trained, untrained TBA, hospital others), examinations, treatments, manipulations during labour, number of vaginal examinations, injections of oxytocin, other medications, maternal fever or illness at onset of labour, degree of hemorrhage, prolapse of umbilical cord, color, odor, meconium staining of amniotic fluid.

History of infant condition and care:

Physical and neurological condition at births and several minutes after (apgar estimate: respiratory effort, color, cry, movement) immediate treatment evolution of the infant.

Conditions and treatments in first months of life: (Births survivors only) Bathing, cord care, feeding, symptoms and treatments for all illness episodes (including terminal episodes in cases) by day or week of life, sources of care.

D. ANALYSIS

Comparison of groups of mothers in component 1 and 2 will initially consist of univariate analysis using non parametric statistical-tests. For each component those variables associated with the outcome interest in this univariate analysis will be examined in logistic regression models.

In Component 1 the sample size indicated will permit a detection of 20% difference between groups of mothers (cases and controls) uniprevalence of single risk factor with $\alpha = 0.05$, power of 0.8.

In Component 2 the power of the sample permits the detection of slightly smaller differences in the prevalence of a single factor or characteristic, with the same statistical assumptions.

Taking into consideration these statistical aspects the sample size has also been judged on similar studies executed in comparable communities and our considerations of feasibility under the time and resource constraints of the proposal.

In component three the sample size indicated will permit detection of a 20% difference in prevalence of single risk factors, with $\alpha = 0.05$, power of 0.8. Association of individual variables with mortality will be examined in univariate analysis using non-parametric statistical methods (Chi-square test, Fisher's exact test) interaction between independent variables will be analyzed in stratified univariate analysis.

CRONOGRAM COMPONENT 1

	1st month	2nd	3rd	4th	5th
1 Personnel contracting and standardization	----				
2 Validation of instruments	-----				
3 Field investigation		-----			
4 Data analysis			-----		
5 Report writing					----

CRONOGRAM COMPONENT 2

	1st month	2nd	3rd	4th	5th
1 Personnel contracting and standardization	----				
2 Validation of the instruments	-----				
3 Field investigation		-----			
4 Data analysis			-----		
5 Report writing					----

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CRONOGRAM COMPONENT 3

	1st month	2nd	3th	4th	5th	6th
1 Personnel Contration and Standarization	-----					
2 Trail and validation of the instruments	-----					
3 Field investigation		-----	-----	-----		
4 Data Analysis			-----	-----	-----	-----
5 Report writing				-----	-----	-----

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REFERENCES

1. Personal Communications, Pamela Putney, Barry Smith, 1989
2. Pan American Health Organization. Health Conditions in the Americas 1977-1980. PAHO Scientific Publications No. 427, Washington, D.C. 1986.
3. Pan American Health Organization. Health Conditions in the Americas 1981-1984 PAHO Scientific Publication No. 500, Washington, D. C. 1986.
4. Documento de Referencia sobre estudio y prevención de la mortalidad materna. OPS/OMS. Programa Salud Materno Infantil. Nov. 1986, Washington, D. C.
5. The magnitude of maternal mortality: Definitions and methods of measurement. R.W. Rochad. Interregional Meeting on Prevention of Maternal Mortality. Geneva 1985.
6. Tabulaciones elaboradas por la Oficina de Estadísticas de Salud de la OPS. Washington, D. C. 1986.

ELEMENTO	1ER COMPONENTE	2DO COMPONENTE	3ER COMPONENTE	TOTAL
030 NOMBRAMIENTOS	1800	1800	2250	5850
035 HORAS EXTRA				
040 CONSULTORES/ASESORES				
230 VIAJES/VIATICOS	160	160	1500	1820
390 SERVICIOS CONTRACTUALES			600	600
399 CONTRATOS LOCALES	6820	6820	5950	19590
490 GASTOS GEN. DE OPERACION(*)	5225	5225	5312	15762
550 SUMINISTROS Y MATERIALES	700	700	1500	2900
600 MOBILIARIO Y EQUIPO				
710 CONSTRUCCIONES				
810 BPCAS				
820 CURSOS, SEMIN. Y TALLERES				
830 SUBVENCIONES				
SUB-TOTAL	14705	14705	17112	46522
999 CONTINGENCIAS (5%)	735	735	855	2325
SUB-TOTAL	15440	15440	17967	48847
920 SERVICIOS COMUNES (___%)	4632	4632	5390	14654
GRAN TOTAL	20072	20072	23357	63501

(*) ELEMENTO 490	COMPON. 1	COMPON. 2	COMPON. 3	TOTAL
490-1 OTROS GASTOS DE OPERACION	925	925	450	2300
490-1 TRANSPORTE	3600	3600	2862	10062
490-2 COMPLETO			1500	1500
490-3 LABORATORIO				
490-4 ENCUESTAS				
490-5 FINCA EXPERIMENTAL				
490-6 AUDIOMISURAS				
490-7 FOTOCOPIAS	700	700	500	1900
490-8 MICROFILM				
TOTAL				

51'